KERRVILLE FIRE MARSHAL
FIRE INSPECTION
&
PLAN REVIEW PROCESS
DEVELOPMENT HANDBOOK GUIDE FOR CONSTRUCTION

KERRVILLE FIRE MARSHAL
87 CORONADO DRIVE KERRVILLE, TEXAS 78028
OFFICE: 830.257.8449 FAX: 830.257.8455

Section 1
General Information Index

This section facilitates application for permit, plan review and inspections. Included are the most frequently found questions, code problems, plans submittal requirements, policies for plan review, permitting and required inspections.

Plans shall only be submitted to the Kerrville Fire Marshal. All submittals require the completion of a Plan Review Submittal Application. Plans will not be accepted without a completed application. **No Exceptions.** Note: When using a courier or mail service, please ensure that a completed application is attached in order to expedite the plan review process.

- **Kerrville Fire Marshal Staff**
- **General Information Guidelines**
- **Plan Review/Permit Fee Schedule**
- **Definitions**
- **Applicable Policy and Codes**
- **General Construction Site Guidelines**

Section 1
General Information

I. Kerrville Fire Marshal Contact Information

Office Phone Number: (830) 257-8449

Fax Phone Number: (830) 257-8455

Mailing Address: 87 Coronado Drive
Kerrville, Texas 78028

Physical Address: 87 Coronado Drive
Kerrville, Texas 78028

Web Site: www.kerrvilletx.gov

Staff E-mail: See below

II. Kerrville Fire Marshal Staff

Fire Marshal

Deputy Fire Marshal

Ted Smith
ted.smith@kerrvilletx.gov

Section 1
General Information
Guidelines

The goal of the Kerrville Fire Marshal is to assist it's customers in understanding our submittal, plan review and inspection process and policies, as they pertain to new construction. Familiarity with and adherence to these guidelines can greatly assist you on compliance with local codes and ordinances, and aid in preparing for inspections.

This guide does not replace, nor supersede any adopted codes and/or ordinances adopted by the City of Kerrville, or determinations and positions of the Fire Chief or Fire Marshal.

To expedite the plan review and inspections processes, please refer to the information listed below.

1. The associated Submittal Application must accompany all Fire Protection System plan submittals.
2. A copy of a Texas Department of Insurance License must accompany all Fire Protection System plan submittals.
3. A copy of the company insurance with the City of Kerrville listed as the Certificate Holder.
4. A State Fire Marshal's Office Licensed Fire Protection Contractor or Professional Engineer must sign all calculations.
5. All Fire Protection Systems plans submitted must be stamped and signed by a State Fire Marshal's Office Licensed Fire Protection Contractor or Professional Engineer.
6. All inspections require a set of approved plans on the job site. Failure to have the approved drawings on-site may result in a failed inspection, re-inspection fees and/or a citation

The contractor is responsible for ensuring that the system(s) being installed or serviced complies with all locally adopted codes, including but not limited to the International Fire Code 2006, NFPA Fire Codes and Fire Marshal requirements.

Plans approved by the City of Kerrville, Fire Marshal's Office give authorization for construction. Final approvals are subject to field verification. ***Any approval issued by the Kerrville Fire Marshal does not release the contractor or property owner from responsibility of full compliance with all applicable codes and ordinances relating to the construction project.***

All installations must concur with the approved plans. Any deviations from the approved plans requires a re-submittal to the Kerrville Fire Marshal.

All plan review and inspection process steps must be followed. Deviation from the requirements can result in delays and possible rejection of plans and/or inspection delays.

Section 1
General Information
Fee Schedule

Permit Fees

Storage Tank Installation	$20.00/Tank
Storage Tank Removal	$50.00/Site
Storage Tank Repair and/or Replacement	$20.00/Site
Pyrotechnical Display	$100 plus $65.00 per hour
Tent, Canopies and Membrane Structures	$20.00
Ceremonial Fire	$15.00
Commercial Bar B Que Pit	$15.00
Water Flow Test	$50.00
Sprinkler System Installation w/out Building Permit	$60.00 plus $0.25/head
Sprinkler System Repair/Modification w/out Building Permit (6 or more)	$60.00 plus $0.25/head
Sprinkler System Installation with Building Permit	Fee Waived
Fire Alarm System Installation w/out Building Permit	$40.00 plus $1.00/device
Fire Alarm System Modification w/out Building Permit (5 or more)	$40.00 plus $1.00/device
Fire Alarm System Installation with Building Permit	Fee Waived
Kitchen Fire Suppression System w/out Building Permit	$40.00
Kitchen Fire Suppression System with Building Permit	Fee Waived

Note: Fees established by the City of Kerrville City Council and changed periodically.

Section 1
General Information
Definitions

Approved: Approved or accepted by the Fire Chief, Fire Marshal or other designated code official.

Building Code: The current building code officially adopted by the City Council, or other such codes officially designated by the City Council for the regulation of construction, alteration, addition, repair, removal, demolition, use, location, occupancy and maintenance of buildings and structures. Such codes shall include but not limited to the International Building Code 2006, International Residential Code 2006, adopted by the City Council and as amended.

Code Official: The fire chief, fire marshal, code enforcement officer, or other designated authority charged by the applicable governing body with the duties of administration and enforcement of the code, or a duly authorized representative.

Fire Chief: The chief officer of the fire department serving the jurisdiction, or a duly authorized representative.

Hazardous Materials: Those chemicals or substances which are physical hazards or health hazards as defined and classified in the International Fire Code 2006, whether the materials are in usable or waste condition.

High - Pile/High – Racked Combustible Storage: Storage of combustible materials in closely packed piles or combustible materials on pallets, in racks or on shelves where the top of storage is greater than 12 feet in height.

IBC: International Building Code 2006

IMC: International Mechanical Code 2006

NEC: National Electrical Code 2008

IRC: International Residential Code 2006

IFC: International Fire Code 2006

NFPA: National Fire Protection Association (Current Editions)

Section 1
General Information
Policy and Codes

Policy

It is the goal of the Kerrville Fire Marshal to complete your plan review within the shortest possible time. We strive to complete your plan review within ten (10) business days from the receipt of the plan submittal package. Please be advised that revisions, changes, or an incomplete submittal package may delay your final plan approval.

Codes

Below is a list of the most commonly referenced codes.

We do not review plans for compliance with the Americans with Disabilities Act or the Texas Accessibility Standards. We do, however review plans in accordance with the locally adopted codes. The City of Kerrville has adopted and amended the International Fire Code 2006. The IFC 2006 does reference specific NFPA codes for additional guidance. Ordinance No. 2007 – 50 Section 50 -6, which adopted the International Fire Code 2006, is available upon request.

International Fire Code 2006
International Building Code 2006
International Mechanical Code 2006
NFPA 10
NFPA 13
NFPA 13R
NFPA 13D
NFPA 14
NFPA 17A
NFPA 20
NFPA 24
NFPA 25
NFPA 58
NFPA 70 National Electrical Code
NFPA 72
NFPA 80
NFPA 90A
NFPA 90B
NFPA 96
NFPA 101
NFPA 105
NFPA 110
NFPA 409

With the exception of the codes from the International Code Council the most recent referenced code will be utilized.

Section 1
General Construction Site Guidelines

This guide is written to assist general contractors and developers with the Fire Marshal's construction site requirements.

This guide does not replace, nor supersede any codes and/or ordinances adopted by the City of Kerrville, or determinations and positions of the Kerrville Fire Marshal.

Please note that the below information is intended as a guideline and, as such, does not constitute all requirements. Additional requirements may be required based upon each individual site.

General Requirements

1. Temporary site address shall be displayed plainly legible and visible from the street or road fronting the property. These numbers shall contrast with their background. Numbers shall be a minimum of 12 inches (304.8 mm) high with a minimum stroke width of 0.5 inch (12.7 mm) facing addressed street.
2. All fire marshal inspection forms and permits shall be kept in a permit packet on the job site until final inspection.
3. See *Inspection Process* Section for further information.

Vertical Construction Approval

4. All permanent fire hydrants and fire lane access roadways shall be installed and approved prior to vertical construction of any building or structure.
5. A water flow test (fire flow) shall be conducted to verify ability to meet the required fire flow for the building or structure. See *Water Flow Testing* for details on this test.
6. Written approval must be given prior to any above slab construction.

Furniture, Fixture and Equipment (FF&E) Approval

7. All required fire protection systems must be installed and approved prior to any stock and/or equipment being installed within a building or structure.
8. Written approval must be given prior to any stock and/or equipment to be placed within the building or structure.

Temporary Fuel Storage Tanks

9. A permit shall be obtained from the Kerrville Fire Marshal prior to placement of any above ground fuel dispensing tanks or containers on construction sites.
10. See *Temporary Storage and Dispensing of Flammable and Combustible Liquids* section in this handbook for additional requirements.

Temporary Heating Devices

11. Temporary heating devices shall be listed and labeled. Installation, maintenance, and use of temporary heating devices shall be in accordance with the terms of the listing.
12. Refueling operations shall be conducted only when the appliance shall be allowed to cool prior to refueling.
13. Clearance to combustibles from temporary heating devices shall be maintained in accordance with the labeled equipment. When in operation, temporary heating devices shall be fixed in place and protected from damage, dislodgement, or overturning in accordance with the manufacturer's instructions.
14. The use of temporary heating devices shall be supervised and maintained only by competent personnel.

Precautions against Fire

15. Smoking shall be prohibited except in approved areas. Signs shall be posted in conspicuous locations. In approved areas where smoking is permitted, approved non-combustible ashtrays shall be provided.
16. Combustible debris shall not be accumulated within buildings. Combustible debris, rubbish, and waste material shall be removed from buildings at the end of each shift work. Combustible debris, rubbish, and waste material shall not be disposed of by burning on site.
17. Materials susceptible to spontaneous ignition, such as oily rags, shall be stored in a listed disposal container.
18. Where required by the code official for building demolition that is hazardous in nature, qualified personnel shall be provided to serve as an on-site fire watch. The sole duty of fire-watch personnel shall be to watch for the occurrence of fire.
19. Operations involving the use of cutting and welding shall be done in accordance with the International Fire Code 2006 Chapter 26.
20. Temporary wiring for electrical power and lighting installations used in connection with the construction, alteration, or demolition of buildings, structures, equipment, or similar activities shall comply with the National Electrical Code 2008.

Flammable and Combustible Liquids

21. Ventilation shall be provided for operations involving the application of materials containing flammable solvents.
22. Flammable and combustible liquid storage areas shall be maintained clear of combustible vegetation and waste materials. Such storage areas shall not be used for the storage of combustible materials.
23. Source of ignition and smoking shall be prohibited in flammable and combustible liquid storage areas. Signs shall be posted.
24. Class I and II liquids shall be kept in approved safety containers.
25. Leaking vessels shall be immediately repaired or taken out of service and spills shall be cleaned up and disposed of properly.

Owner's Responsibility for Fire Protection

26. The owner shall designate a person to be the Fire Prevention Program Superintendent who shall be responsible for the fire prevention program and ensure that it is carried out through completion of the project. The fire prevention program superintendent shall have the authority to enforce the provisions of these guidelines and other provisions as necessary to secure the intent of this chapter. When guard service is provided, the superintendent shall be responsible for the guard service.
27. The fire prevention program superintendent shall develop and maintain an approved prefire plan in cooperation with the fire chief. The fire chief and the code official shall be notified of changes affecting the utilization of information contained in such prefire plans.
28. Training of responsible personnel in the use of fire protection equipment shall be the responsibility of the fire prevention program superintendent.
29. The fire prevention program superintendent shall determine that all fire protection equipment is maintained and serviced in accordance with this code. The quantity and type of fire protection equipment shall be approved.
30. The superintendent shall be responsible for supervising the permit system for hot work operations in accordance with the International Fire Code.
31. Impairments to any fire protection system shall be in accordance with the International Fire Code 2006 Chapter 9 Section 901. See *Fire Watch Guidelines* for more information.
32. Temporary covering of fire protection devices. Coverings placed on or over fire protection devices to protect them from damage during construction processes shall be immediately removed upon the completion of an acceptance test.
33. Readily accessible emergency telephone facilities shall be provided in an approved location at the construction site. The street address of the construction site and the emergency telephone number of the emergency services shall be posted adjacent to the telephone.

Means of Egress

34. Where a building has been constructed to a height greater than 50 feet (15 240mm) or four stories, or where an existing building exceeding 50 feet (15 240 mm) in height is altered, at least one temporary lighted stairway shall be provided unless one or more of the permanent stairways are erected as the construction progresses.
35. Required means of egress components shall be maintained during construction and demolition.

Standpipes

36. Buildings four or more stories in height shall be provided with not less than one standpipe for use during construction. Such standpipes shall be installed when the progress of construction is more than 40 feet (12 192 mm) in height above the lowest level of fire department access. Such standpipe shall be provided with fire department hose connections at accessible locations adjacent to usable stairs. Such standpipes shall be extended as construction progresses to within one floor of the highest point of construction having secured decking or flooring.
37. Buildings being demolished. Where a building is being demolished and a standpipe is existing within such a building, such standpipe shall be maintained in an operable condition to be available for use by the fire department. Such standpipe shall be demolished with the building but shall not be demolished more than one floor below the floor being demolished.
38. Water supply for fire protection shall be made available as soon as combustible material arrives on site.

Automatic Sprinkler System

39. In buildings where an automatic sprinkler system is required by this code or the International Building Code, it shall be unlawful to occupy any portion of a building or structure until the automatic sprinkler system installation has been tested and approved.
40. Operation of sprinkler control valves shall be allowed only by properly authorized personnel and shall be accompanied by notification of duly designated parties. When the sprinkler protection is being regularly turned off and on to facilitate connection of newly completed segments, the sprinkler control valves shall be checked at the end of each work period to ascertain that protection is in service.

Portable Fire Extinguishers

41. Structures under construction, alteration, or demolition shall be provided with not less than one approved portable fire extinguisher at each stairway on all floor levels where combustible materials have accumulated. An approved portable fire extinguisher shall be provided in every storage and construction shed. The code official is authorized to require additional approved portable fire extinguishers where special hazards exist, such as flammable or combustible liquids storage hazards.

Safeguarding Roofing Operations

42. Roofing operations utilizing heat-producing systems or other ignition sources shall be performed by a contractor licensed and bonded for the type of roofing process to be performed.
43. Asphalt and tar kettles shall operate in accordance with the International Fire Code 2006, Chapter 3, Section 303.
44. Fire extinguishers for roofing operations. There shall be at least one multi-purpose portable fire extinguisher with a rating of 2-A:20B:C on the roof being covered or repaired.

Section 2
Plan Review Process

This section facilitates application for permit, plan review and inspections. Included are the most frequently found questions, code problems, plans submittal requirements, policies for plan review and permitting.

- **Site Plan – Commercial**
- **Site Plan – Residential**

Section 2
Plan Review Process
Site Plans - Commercial

This guide is intended as a resource for the civil construction plan submittal requirements for commercial properties.

Civil construction plans consist of the approved site plan, roadways, fire lanes, landscape plans, water, sewer, drainage, and other utility plan drawings. Civil construction plans are reviewed to determine compliance with Fire Marshal requirements as they relate to site construction and layout, building size, fire lanes, fire department access, fire hydrants, and other issues as designated. These requirements can be found in the International Fire Code 2006, as adopted and amended by the City of Kerrville. **Plans are not reviewed, or approved, for fire protection system installation.** In an effort to expedite the Fire Marshal's civil plan review process, please ensure the following list of items are incorporated into the proposed civil construction plans.

Please note that the below information is intended as a guideline and, as such, does not constitute all requirements. Additional requirements may be required based upon each individual plan.

General Comments

1. Site plan in the civil construction drawing set shall be the site plan approved by the Fire Marshal.

Fire Access

2. If fire lanes are provided, they shall meet the criteria stipulated in the *Fire Lanes* Section.
3. Size, type and location of turnarounds are required to be approved by the Fire Marshal. *(see Approved Fire Lane Turnaround Section)*
4. Gated access is required to be reviewed and approved by the Fire Marshal. *(See Access Control Gates Section)*
5. A minimum of two (2) points of emergency vehicle access shall be provided. The two points of access shall be a minimum of one half of the length of the maximum overall diagonal dimension of the property or area to served, measured in a straight line between accesses. This includes a cross access/mutual access fire lane.
6. Approved, unobstructed fire department access (fire lanes) shall be provided such that all potions of the exterior of the building shall be within 150 feet, as the hose lays, of a fire lane and/or public street.
7. Additional fire lanes may be required based upon the layout of the site and size of the building(s) with regards to Fire Department access, mutual/cross access, special hazards or as designated by the Fire Marshal.
8. Fire lanes must meet the following criteria:
    a. Fire lanes with a width of 24 feet, require an inside turning radius of 25 feet and an outside radius of 50 feet.
    b. Fire lanes with a width of 26 feet, require an inside turning radius of 25 feet and an outside radius of 50 feet.
    c. Minimum clear vertical height clearance of 13 feet 6 inches.
    d. Support 75,000 pounds for vehicle weight.
    e. Cannot exceed 10 percent in grade change without approval of the Fire Chief.
    f. Buildings or portions of buildings or facilities exceeding 30 feet (9144 mm) in height above the lowest level of fire department vehicle access shall be provided with approved fire apparatus access roads capable of accommodating fire department aerial apparatus. Overhead utility and power lines shall not be located within the aerial fire apparatus access roadway. Fire apparatus access roads shall have a minimum unobstructed width of 26 feet (7925 mm) in the immediate vicinity of any building or portion of building more than 30 feet (9144 mm) in height. At least one of the required access routes meeting this condition shall be located within a minimum of 15 feet (4572 mm) and a maximum of 30

feet (9144 mm) from the building, and shall be positioned parallel to one entire side of the building.

9. Dead end fire lanes in excess of 150 feet shall be provided with an approved turnaround.
10. Fire Lanes shall be shaded on the site plan with clearly indicated width, radii and construction details.

Fire Hydrants and Water Lines

11. When fire hydrants are required, they shall meet the criteria stipulated in the *Fire Hydrants* Section.
12. Existing fire hydrants shall be indicated on the plans.
13. Proposed new fire hydrants shall be indicated on the plans.
14. Location of valves.
15. Fire hydrant type and construction details. Fire hydrants are required to have (2) 2-1/2" connections and (1) 5" steamer connection.
16. Type and size of underground water lines serving the fire hydrants and other utility services.
17. Size and location of underground water lines service for the fire sprinkler system.
18. Location of Backflow Prevention
19. Required needed fire flow must be achieved in accordance with the International Fire Code 2006 Appendix B.
20. A minimum required fire flow of 1500 gpm is required for commercial properties.
21. Fire hydrants shall be so spaced such that all portions of the exterior of the building are within 500 feet as the hose lays.
22. Spacing between fire hydrants shall not exceed 500 feet. Spacing may be required to be reduced based upon the required fire flow and site conditions.
23. Distances between hydrants shall be measured along the route the fire hose is laid by a fire apparatus vehicle, not as the "crow flies".
24. Proposed location of the Fire Department Connection (FDC). Note that the FDC is required to be along the fire lane and within 75 feet, as the hose lays, of a fire hydrant.
25. The Fire Department Connection is required to be located away from the building at a minimum distance of 1 ½ times the height of the building or at an alternate location approved by the Fire Marshal.
26. A minimum of a 5 foot wide pathway shall be provided from the fire hydrant to the FDC. Parking/loading spaces are not considered a clear pathway.
27. See *Fire Hydrants* Section for additional information regarding location and spacing.

Additional Site Plan Requirements

28. Minimum 10 foot wide, clear and unobstructed path around the exterior of the building with a maximum 3 percent cross-slope. This is to include a path around AC units, large shrubs, large trees, gates or other construction or utilities unless otherwise approved by the Fire Marshal.
29. Building or facility size, in square feet, to be indicated on the site plan.
30. Building or facility construction type to be indicated on the site plan.
31. Building height to be indicated on the site plan.
32. Indicate if a fire sprinkler system will be installed.
33. If the building is equipped with an electric fire pump for the fire sprinkler system, a secondary direct feed will be required to the pump controller. This feed must be circumvent the primary utility feed disconnect.
34. Fire hydrants and fire lane access roadways shall be installed and maintained ***PRIOR TO VERTICAL CONSTRUCTION*** of any building or structure.

Fire Protection Systems

Plans are not reviewed, or approved, for fire protection system installation or underground fire service line installation.

35. A Texas Department of Insurance licensed fire sprinkler contractor and/or a licensed underground fire line contractor must install the fire sprinkler underground piping system, from the point the water line leaves the circulating water system and is dedicated to fire protection use, to a point 5 feet inside the building and 1 ft. above the finish floor. Plans must be submitted to the Fire Marshal for review and approval, prior to installation.

Section 2
Plan Review Process
Site Plans – Residential One and Two Family Units

This guide is intended as a resource for the civil construction plan submittal requirements for residential subdivisions.

Civil construction plans consist of the approved plat; roadways, fire lanes, water, sewer, drainage, and other utility plan drawings. Civil construction plans are reviewed to determine compliance with Fire Marshal requirements as they relate to site construction and layout, building size, fire lanes, fire department access, fire hydrants, and other issues as designated. These requirements can be found in the International Fire code 2006, as adopted and amended by City of Kerrville. In an effort to expedite the Fire Marshal's civil plan review process, please ensure the following list of items are incorporated into the proposed civil construction plans.

General Comments

1. Ensure plat in the civil construction drawing set matches the plat approved by staff, P & Z or City Council.
2. Fire lanes shall be shaded on the site plan with clearly indicated radii and construction details.

Fire Access

3. If fire lanes are provided, they must meet the criteria stipulated in the *Fire Lane Section*.
4. Two points of emergency vehicle access shall be provided. The two points of access shall be a minimum of 140 feet apart. In lieu of providing a second point of access, if all homes located within the residential subdivision are provided with an approved NFPA 13D residential sprinkler system, consideration to only one access point will be given. A separate submittal and letter of intent is required. Contact the Fire Marshal's Office for guidance on acceptance of this alternate method.
5. A temporary fire lane, if provided as a second point of emergency vehicle access, shall meet the following criteria:
    a. Cleary identified and marked as Fire Department Emergency Vehicle Access Only.
    b. Shall be provided with signage and stripped in accordance with the International Fire Code 2006 and the City of Kerrville Fire Code Ordinance.
    c. Must be certified by a structural engineer to support a 75,000 lb. fire apparatus and/or meet City construction standards for a fire lane.
    d. Meet any other requirements as determined by the Fire Marshal.
    e. Construction and arrangement must be approved by the Fire Marshal prior to civil plan approval.
    f. A separate submittal and letter of intent is required.
    g. Upon completion of the subdivision, a <u>permanent second point of access</u> must be provided.
    h. Provide an all-weather driving surface.
    i. If curbs are to be either required or provided, they shall be mountable curbs and designed per City of Kerrville standards.
6. If fire lanes will constitute a second point of access, construction details must be included. This is to include temporary emergency access easements. See *Fire Lane section* for additional information.
7. All gated access points are required to be reviewed, approved and permitted by the Fire Marshal, under separate instrument. See *Access Control Gates Section* for information.
8. Dead-end streets cannot exceed 150 feet without an approved turnaround. Size, type and location of turnarounds are required to be approved by the Fire Marshal.
9. The maximum cul-e-sac length shall not exceed 600 feet in length as measured from the centerline of the intersection/street to the center point of the radius.
10. All cul-de-sacs shall have a minimum right-of-way width of 100 feet.

Fire Hydrants and Water Lines

11. Existing fire hydrants shall be indicated on the plans.
12. Proposed new fire hydrants shall be indicated on the plans.
13. Location of valves.
14. Fire hydrant type and construction details. Fire hydrants are required to have (2) 2-½" connections and (1) 5" steamer connection.
15. Type and size of underground water lines serving the fire hydrants, and other utility services.
16. A minimum required fire flow of 1000 gpm is required for one or two family homes less than 3600 square feet. All other shall comply with the International Fire Code 2006 Appendix B.
17. Spacing between fire hydrants shall not exceed 500 feet. The spacing required may be increased or decreased due to the required fire flow requirements of the subdivision.
18. All homes shall be within 500 ft. of a fire hydrant.
19. Fire hydrants shall not be located in the bulb of a cul-de-sac.
20. Distances between hydrants shall be measured along the route the fire hose is laid by a fire apparatus vehicle, not as the "crow flies".
21. See *Fire Hydrant Guidelines* for additional information regarding location and spacing.

Fire Protection Systems

Plans are not reviewed or approved for fire protection system installation.

22. See *Fire Protection Systems Section* for further details.

Additional Information

23. Fire hydrants and fire lane access roadways shall be installed and maintained prior to vertical construction of any building or structure.

Section 3
Building Plan Review Process Index

This section facilitates application for permit, plan review and inspections. Included are the most frequently found questions, code problems, plans submittal requirements, policies for plan review and permitting and required inspections.

- **Tenant Finish – Out and/or Building Alteration**
- **Building Construction**
- **Mid – Rise Building Construction**

Section 3
Tenant Finish – Out and/or Building Alteration

Tenant Finish-Out/Building Alteration plans consist of lease spaces within strip malls, warehouses, office buildings or other construction in which only a portion or portions of the building is modified, altered or otherwise changed. This typically includes office spaces, existing buildings, multiple occupancy spaces, and warehouses.

Tenant Finish-Out/Building Alterations are reviewed to determine compliance with Fire Marshal requirements as they relate to building construction and layout, fire department access, protection in place, exiting and other issues as designated. These requirements can be found in the International Fire Code 2006, as adopted and amended by City of Kerrville. In an effort to expedite the Fire Marshal's plan review process, please ensure the following list of items are incorporated into the proposed tenant finish-out plans. Please note that not all of the below requirements pertain to all submittals:

All submitted plans shall comply with the following:

1. Type of occupancy. *(i.e. A – Assembly, B – Business, E – Educational, M – Mercantile, S – Storage, etc.)*
   NOTE: Based upon a change of occupancy of an existing space, additional criteria to include providing an automatic fire sprinkler system may be required.
2. Indicate total square footage and/or square footage of each occupancy in multiple occupancy spaces.
3. Type of construction (combustible, noncombustible or combustible concealed spaces).
4. Is the building provided with an existing fire sprinkler system or fire alarm system?
5. Documentation regarding the operation(s) of the proposed business. Based upon this information, a complete diagram with regards to the storage configuration may be required. Please see the *Storage Occupancy Section* for additional information.
6. Number, type, and arrangement of exits. Typically, a minimum of two (2) exits is required.
7. Wall and ceiling finishes shall be in accordance with the International Fire Code 2006, Table 806.3, for all corridors, rooms and enclosed spaces, for type A, E, & I Occupancies. May be required for other occupancy type
8. The tenant separation wall/demising wall shall be a minimum of 1-hr fire rated construction. The 1-hr rated designation shall be clearly indicated. The U.L listing number shall be provided.
9. A minimum of one 2A-10BC fire extinguisher per 3000 sq. ft., with a maximum travel distance of 75 ft and at all exits.
10. Emergency lighting for the interior and exterior egress may be required in accordance with the International Fire Code Chapter 10 Section 1003.2.11.
11. Provide emergency lights and exit lights in accordance with the International Fire Code 2006 Chapter 10 Sections 1003.2.11 and 1003.2.10.
12. Indicate emergency lighting shall be tied to the lighting circuit in which it serves.
13. Knox Box entry system may be required, with the box installed no higher than 5 feet above grade.
14. Storage of combustibles is not permitted within 18" clearance of the ceiling, for sprinkled occupancies and 24 inches with non-sprinkled occupancies.
15. All exit doors located in the means of egress that are capable of locking or latching shall be operable from the inside without the use of a key or any special knowledge or effort, or provided with approved panic hardware.
16. Arrangement of interior walls and/or drop ceiling may interfere with the operation of the fire sprinkler system.
17. Will any type of special protection system be required? (i.e. ventilation, smoke dampers, fire alarm, fire sprinkler, kitchen hood, storage tank)
18. Additional criteria as required by the Fire Marshal.

The following items are listed to aid the applicant in what will be required to complete the project that is not included in the finish-out review. This is intended as a partial list only, and is not all-inclusive.

Fire Protection Systems

Plans are not reviewed or approved for fire protection system installation.

19. A Texas Department of Insurance licensed fire alarm contractor must install/modify the fire alarm system. Plans must be submitted to the Fire Marshal for review and approval.
20. A Texas Department of Insurance licensed fire sprinkler contractor must modify the fire sprinkler system. Plans must be submitted to the Fire Marshal for review and approval.
21. A Texas Department of Insurance licensed fire extinguisher contractor must install/modify the kitchen hood extinguishing system. Plans must be submitted to the Fire Marshal for review and approval.
22. A Texas Department of Insurance licensed aboveground/underground storage tank contractor must install/modify the aboveground/underground storage tank system. Plans must be submitted to the Fire Marshal for review and approval.
23. All access controlled egress doors shall meet the requirements of the International Fire Code 2006 Chapter 10 Section 1003.3.1.3.4, "Access –controlled egress doors". Access control doors are required to be reviewed, approved and permitted by the Fire Marshal.

Addressing

24. New and existing buildings shall have approved address numbers, building numbers or approved building identification placed in a position that is plainly legible and visible from the street or road fronting the property. These numbers shall contrast with their background. Address numbers shall be Arabic numerals or alphabet letters. Numbers shall be a minimum of 4 inches (102 mm) high with a minimum stroke width of 0.5 inch (12.7 mm).
25. When located on a glass background, numerals or address shall be posted on a minimum 6 ½ inch by 10 inch background.
26. Address must be provided at gas and electric meters and/or disconnecting means

Additional Permits Needed

27. See the following sections for additional permitting requirements if such systems are proposed with your building or structure:
    a. Section 4, Fire Protection systems
    b. Section 5, Additional Required Permits

Section 3
Building Construction

Building plans are reviewed to determine compliance with Fire Marshal requirements as they relate to building construction and layout, fire department access, protection in place, exiting and other issues as required or designated. ***These requirements can be found in the International Fire Code 2006, as adopted and amended by City of Kerrville.*** In an effort to expedite the Fire Marshal's plan review process, please ensure the following list of items are incorporated into the building construction plans. Please note that not all of the below requirements pertain to all submittals:

It is recommended by the Fire Marshals Office that a pre-construction meeting is requested to discuss your project in detail.

All submitted plans shall comply with the following:

1. Type of occupancy. *(i.e. A – Assembly, B – Business, E – Educational, I – Institutional, M – Mercantile, S – Storage, etc.)*
2. Indicate total square footage and/or square footage of each occupancy in multiple occupancy spaces.
3. Is the building to be provided with a fire sprinkler system, fire alarm system or other fire protection system?
4. An automatic system shall be installed throughout all buildings in accordance with the International Fire Code 2006.
5. Type of construction (Type 1, Type II, Type III, etc).
6. Documentation regarding the operation(s) of the proposed business. A complete diagram with regards to the storage configuration may be required. Based upon this information, additional requirements with and building features may be required. Please review the International Fire Code 2006 for any features that may be applicable to your building. EXAMPLE: Storage over 12 ft. is considered high-piled and the requirements of Section 23 will be required to be met.
7. Number, type, size, separation, width and arrangement of exits. This is to include the corridor rating, travel distance, and common path of travel. An egress plan is typically requested which indicates the required exits, distance to the exit and total width and number provided.
8. Egress plan to indicate the required exits, path of travel, travel distance and floor fixtures.
9. Wall and ceiling finishes shall be in accordance with the International Fire Code 2006, Table 806.3, for all corridors, rooms and enclosed spaces.
10. The tenant separation wall/demising wall shall be a minimum of 1-hr fire rated construction. The 1-hr rated designation shall be clearly indicated. The U.L listing number shall be provided. Higher rated walls may be required based upon occupancy and adjacent uses.
11. Indicate any types of special hazards. (i.e. medical gases, dust operations, spraying operations, etc.)
12. Occupancy separation walls shall be in accordance with the International Building Code 2006.
13. Flammable or combustible liquids tank storage.
14. A minimum of one 2A-10BC fire extinguisher per 3000 sq. ft., with a maximum travel distance of 75 ft. Indicate the location and size of all fire extinguishers.
15. Address must be legible from the street or fire lane.
16. Address must be provided at gas and electric meters and/or disconnecting means.
17. Provide emergency lighting in accordance with the International Fire Code 2006 Chapter 10 Section 1006.
18. Provide exit lights in accordance with the International Fire Code 2006 Chapter 10 Section 1011.
19. Electrical and mechanical plans are included and reviewed for compliance with the above lighting requirements.
20. Knox Box entry system may be required, with the box installed no higher than 5 feet above grade.
21. Provide an outside door to access the room where the sprinkler riser and fire alarm panel are to be located. *For an example; mechanical and electrical rooms.* To be approved by the Fire Marshal's Office.

22. Storage of combustibles is not permitted within 18" clearance of the ceiling, for sprinkled occupancies and 24 inches for non-sprinkled occupancies.
23. All exit doors located in the means of egress that are capable of locking or latching shall be operable from the inside without the use of a key or any special knowledge or effort, or provided with approved panic hardware. Indicate the type of egress hardware on all exits.
24. Arrangement of interior walls and/or drop ceiling may interfere with the operation of the fire sprinkler system.
25. Will any type of special protection system be required? (i.e. ventilation, smoke dampers, smoke control, kitchen hood, storage tank)
26. Complete listing of hazardous materials, if any, and storage and location information.
27. See *Mid-Rise Building Construction* Section if residential occupancy that is three or more stories in height but is not classified as a high-rise.

Hazardous Materials

28. Please see our *Hazardous Materials Submittal Section* for additional information regarding required plans submittal requirements. All occupancies containing hazardous materials regulated by Chapter 27 shall be required to have a permit. The permit shall be valid for one year and will be required to be renewed annually.
29. Building construction and fire protection features shall comply with the applicable requirements of the International Fire Code Chapter 27.

High-Piled Storage

30. High-piled storage is defined as the storage of combustible materials in closely packed piles of combustible materials on pallets, in racks or on shelves where the top of storage is greater than 12 feet in height;
31. Please see our *High-Piled Storage Submittal Section* for additional information regarding required building features, fire protection and plan submittal requirements. All occupancies containing high-piled storage regulated by Chapter 23 of the International Fire Code 2006 shall be required to have a permit. The permit shall be valid for one year and will be required to be renewed annually.
32. Building construction and fire protection features shall comply with the applicable requirements of the International Fire Code 2006 Chapter 23.
33. A rack storage plan is required prior to fire sprinkler plan approval.

The following items are listed to aid the applicant in what will be required to complete the project that is not included in the building plan review. ***This is intended as a partial list only, and is not all-inclusive.*** If the modification/installation of a fire protection system shall be required, the Fire Marshal Building Plan Review shall indicate the type(s) of fire protection system required.

Fire Protection & Access Systems

Plans are not reviewed, or approved, for fire protection system installation.

34. A Texas Department of Insurance licensed fire alarm contractor must install the Fire Alarm System. Plans must be submitted to the Fire Marshal for review and approval.
35. A Texas Department of Insurance licensed fire sprinkler contractor must install the overhead Fire Sprinkler System. Plans must be submitted to the Fire Marshal for review and approval.
36. A Texas Department of Insurance licensed fire sprinkler contractor must install the underground Fire Sprinkler System. Plans must be submitted to the Fire Marshal for review and approval.
37. A Texas Department of Insurance licensed fire extinguisher contractor must install the Kitchen Hood/Paint Spray Booth extinguishing system. Plans must be submitted to the Fire Marshal for review and approval.
38. A Texas Department of Insurance licensed aboveground/underground storage tank contractor must install the aboveground/underground storage tank system. Plans must be submitted to the Fire Marshal for review and approval.
39. All access controlled egress doors shall meet the requirements of IFC 1003.3.1.3.4, "Access - Controlled Egress Doors". Access control doors are required to be reviewed, approved and permitted by the Fire Marshal.

Additional Permits Needed

40. See the following sections for additional permitting requirements if such systems are proposed with your building or structure:
    a. Section 4, Fire Protection Systems
    b. Section 5, Additional Required Permits

Section 3
Mid–Rise Building Construction Policy

The following policy is intended to support existing standards to insure fire and life safety for occupants of "mid–rise" residential occupancies. **This includes three or more in height, but not classified as a "high–rise".** Mid–rise building plans are reviewed to determine compliance with Fire Marshal requirements as they relate to building construction and layout, fire department access, protection in place, exiting, and other issues designated. These requirements can be found in the International Fire Code 2006, as adopted and amended by the City of Kerrville. In an effort to expedite the Fire Marshal's plan review process, please ensure the following list items are incorporated into the building construction plans.

It is recommended by the Fire Marshal's Office that a pre-construction meeting is requested to discuss your project in detail. Since these structures vary in design and present unique fire and life safety concerns, additional requirements may be requested by the Fire Marshal and/or Fire Chief.

1. All residential portions of the building shall be fully protected with an automatic fire sprinkler system. NFPA 13R systems may be used in these residential areas, but sprinkler protection shall be provided for common corridors, balconies, attic spaces (roof attic only), bathrooms, closets exceeding 6 square feet, and closets with a minimum dimension exceeding 18 inches. NFPA 13 systems shall be provided for retail areas and parking structures.
2. A standpipe system (designed in accordance with NFPA and International Fire Code 2006) shall be installed in every stairwell. The standpipe system shall be interconnected to the automatic fire sprinkler system and have a designated FDC (fire department connection) for the standpipe system.
3. Automatic fire alarm systems shall be analog intelligent addressable fire detection systems designed in accordance with NFPA and the International Fire Code 2006.
4. Each residential unit shall be equipped with fire alarm horns (mini-horns) to provide the adequate decibel level in accordance with NFPA 72.
5. At least one elevator shall be designed so it can accommodate a medical stretcher. Minimum size shall be in accordance with the International Building code 2006.
6. Gated access is required to be reviewed and approved by the Fire Marshal. See *access Control Gates* section.

Additional Permits Needed

7. See the following sections for additional permitting requirements if such systems are proposed with your building or structure:
    a. Section 4, Fire Protection Systems
    b. Section 5, Additional Required Permits

Section 4
Fire Protection Systems Index

This section facilitates application for permit, plan review and inspections. Included are the most frequently found questions, code problems, plans submittal requirements, policies for plan review and permitting and required inspections.

Plans shall only be submitted to the Kerrville Fire Marshal. All submittals require the completion of a Plan Review Submittal Application. Plans will not be accepted without a completed application. **No Exceptions.** Note: When using a courier or mail service, please ensure that a completed application is attached in order to expedite the plan review process.

- **Fire Sprinkler Underground**
- **Fire Sprinkler Aboveground (New System)**
- **Fire Department Connection (FDC)**
- **Fire Pump**
- **Standpipe**
- **Fire Sprinkler Aboveground (Modification and/or Alteration)**
- **Fire Alarm**
- **Fire Alarm and Sprinkler Monitoring**
- **Fire Alarm Systems, Tenant Finish-Out/Building Alteration**
- **Elevator Recall and Shunt Trip**
- **Commercial Kitchen Fire Suppression Systems**

Section 4
Fire Sprinkler Underground Submittal

These guidelines are to be followed when a business, facility or organization proposes to install an underground water supply serving an automatic fire sprinkler system, within the City of Kerrville. ***These guidelines are not to be interpreted as containing all data required for proper design, installation or approval.***

All fire sprinkler system underground piping for the purposes of this guideline and any other guidelines or requirements of the Fire Marshal shall conform to the International Fire Code 2006, as adopted and amended by City of Kerrville and NFPA 24 2010.

This guide does not replace, nor supersede any adopted codes and/or ordinances adopted by the City of Kerrville, or determinations and positions of the Fire Chief or Fire Marshal.

General Plan Requirements

1. All underground lines shall begin at the point of connection to the underground circulating public/private water main. A valve shall be provided at the point of connection such that the fire sprinkler underground service line can be isolated from public/private water distribution system.
2. Underground piping shall have a 10 foot minimum separation from all other utilities and placed in a separate trench. Underground piping within 5 feet of the building may be combined with other utilities for entrance into the building.
3. All underground lines shall terminate at the top of the spigot piece no more than 5 ft. inside the building.
4. All ductile iron, retaining rods, and other non-plastic components shall be externally coated for corrosion and poly-wrapped.
5. Plan Review Application must accompany all submittals. Submittals will not be approved without an application.
6. All underground piping shall be a minimum of Class 200 / DR14 200 PSI rated pipe or greater.
7. Fire Department connections (FDC) shall be a separate and independent service main from underground water line.
8. A single point for FDC's shall be provided for buildings with multiple risers.
9. Systems must be designed with a 10 psi safety factor margin with a 20 psi residual on all city mains.
10. Installation street address must be provided for each separate underground line being permitted and installed. Subdivision or development street corner will not be accepted.
11. The designer and company of record is responsible for the entire system to be installed.
12. Civil construction drawings approved by the City of Kerrville Engineering Department shall not constitute approval of the underground line(s).
13. **All equipment and piping shall NOT be installed PRIOR TO approval of plans and issuance of permit(s).**

Submittal Requirements

14. An Underground or General RME ("WET") signature and stamp is required on all plan drawings.
15. Provide a minimum of two (2) sets of plans. One set of plans is to be in PDF Format and the second in paper form.
16. Project name.
17. Project address.
18. A scaled copy of the ***approved*** Site Plan that indicates the location of all fire hydrants and fire lanes servicing the building or site. The size and type of building shall be clearly indicated on the plan.
19. Size and location of all water supplies and/or water lines servicing the building or site.
20. Flow test data, provided by the Kerrville Fire Marshal and witnessed by a representative shall be shown on the plans.
21. Size and type of all piping identified on the plans.
22. Occupancy classification.

23. Construction type.
24. Location of all valves.
25. Location and size of all thrust blocks.
26. Thrust block details.
27. Detail of the spigot piece and/or and in-building riser turn.
28. Embedment detail. *See Figure 1.*
29. Embedment material shall be No. 4 crushed stone.
30. Depth of bury. Minimum is 48 inches/4 feet, from top of pipe to grade.
31. Pit/vault/valve arrangement (if provided with a pit/vault).
32. Type of fittings/joints, methods of connection and rod size.
33. Location and type of Fire Department Connection (FDC).
34. Manufacturer's data sheets for all components used in the project including manufacturer's parameters and listing organizations approval.
35. Location and type of backflow prevention.
36. Provide information on the transition stability of different types of piping (eg. transition from PVC to ductile iron, retainer glands).

Backflow Prevention

37. All fire sprinkler systems are required to be provided with an approved method of backflow prevention.
38. The City of Kerrville Building and Engineering Departments shall determine the final location of the backflow assembly. As a general rule, if the fire service lead-in is less than 100 ft. in total length, then the assembly may be located within the riser room. If the fire service lead-in is over 100 ft in total length, then the assembly must be located adjacent to the tap, preferable in an easement. Contact the Engineering Department for requirements pertaining to backflow assembly location when not located inside the building.
39. A reduced pressure zone backflow prevention device is required on antifreeze systems.
40. Assemblies shall be listed for fire protection use.
41. Assemblies must be capable of being electronically monitored.
42. Assemblies must be provided with a bypass valve.
43. All installations shall be inspected and tested. Testing documentation shall be provided upon request.
44. All installation shall be inspected by the City of Kerrville Water Department.

General Requirements

45. Each submittal shall have a completed:
46. Kerrville Fire Marshal Plan Review/Permit Application
47. Copy of Contractors Texas Department of Insurance License and Liability Insurance with the city of Kerrville as the certificate holder.
48. Plans approved by the Kerrville Fire Marshal's Office give authorization for construction and/or operation. Final approvals are subject to field verification. Any approval issued by the Fire Marshal's Office does not release the contractor or property owner from the responsibility of full compliance with all applicable codes and ordinances relating to the construction project.
49. Installation, fabrication or otherwise construction of the system is prohibited without approved plans and permit.
50. All installations and/or operations must concur with the approved plans. Any deviation from the approved plans requires a re-submittal to the Fire Marshal's Office.
51. All fire department inspection forms and permits shall be kept in a permit packet on the job site until final inspection.
52. Submittals that do not conform to the minimum above requirements will not be approved.

IMPORTANT INSPECTION INFORMATION

53. Visual inspection of the installation shall be performed **PRIOR TO** cover. If the piping and joints are covered prior to installation, you will be required to uncover the piping for inspection, regardless of cover. **NO EXCEPTIONS.**
54. All underground piping shall be thoroughly flushed **PRIOR TO** connecting to the system risers or other aboveground piping system(s). If the underground piping is connected to the system riser,

"stacked", both the overhead and underground piping will be required to be flush in accordance with the requirements of NFPA 13 and NFPA 24.

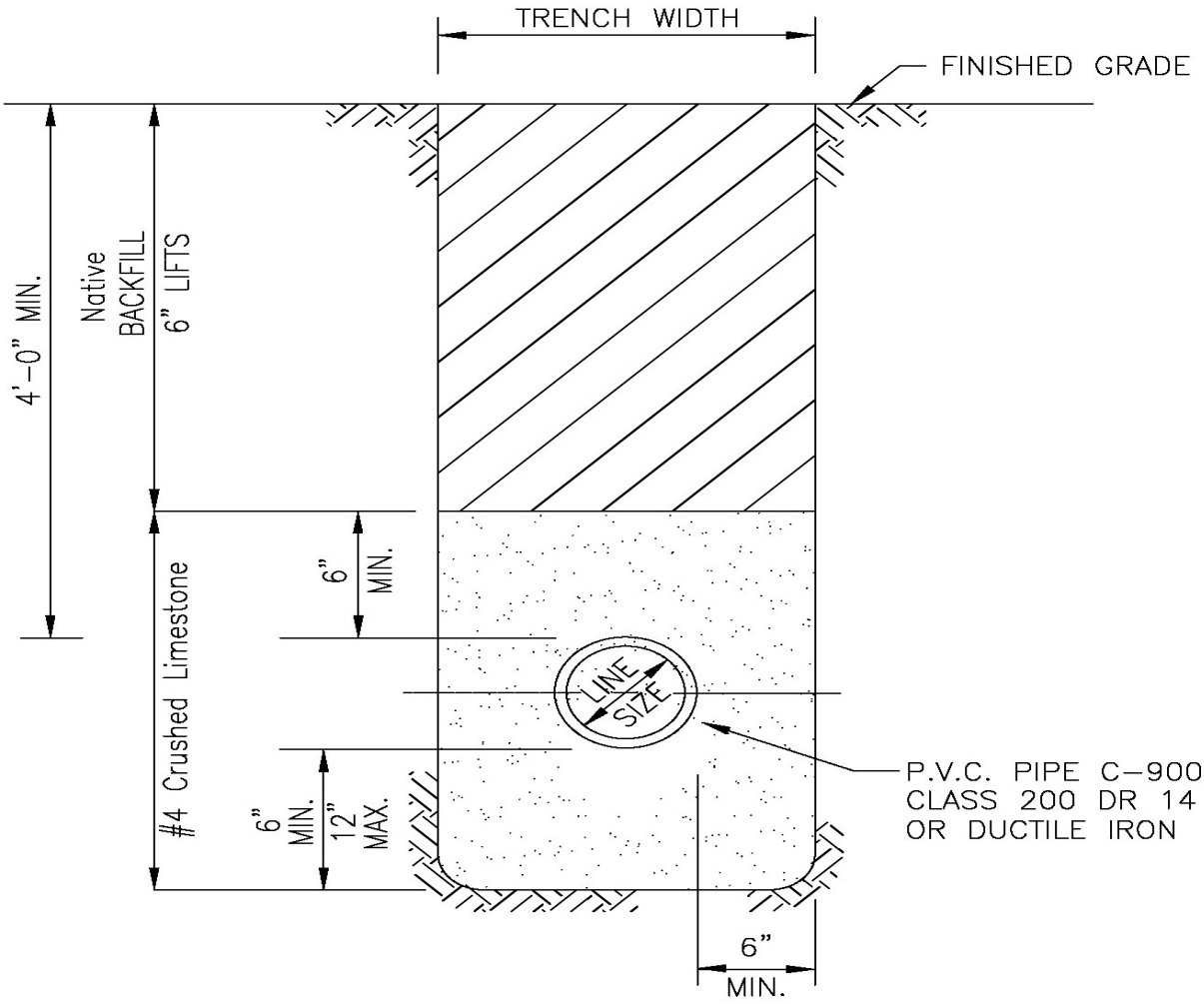
55. Hydrostatic test and flush of the fire sprinkler underground lines shall be required at the same time the visual inspection is performed. **NO EXCEPTIONS.** The piping will be allowed to be center loaded to prevent pipe movement.
56. See *Fire Sprinkler Underground Inspection Section* for detailed criteria.

Standard Details

57. See attached pages for standard detail sets.
58. All standard details can be provided in PDF file format for incorporation into you submittal drawings.
59. With the exception of the Embedment Detail, all details provided are for guidance only. Actual site conditions and NFPA 24 will determine the actual necessary details to be provided to indicate the construction of the underground pipe.

Standard Details

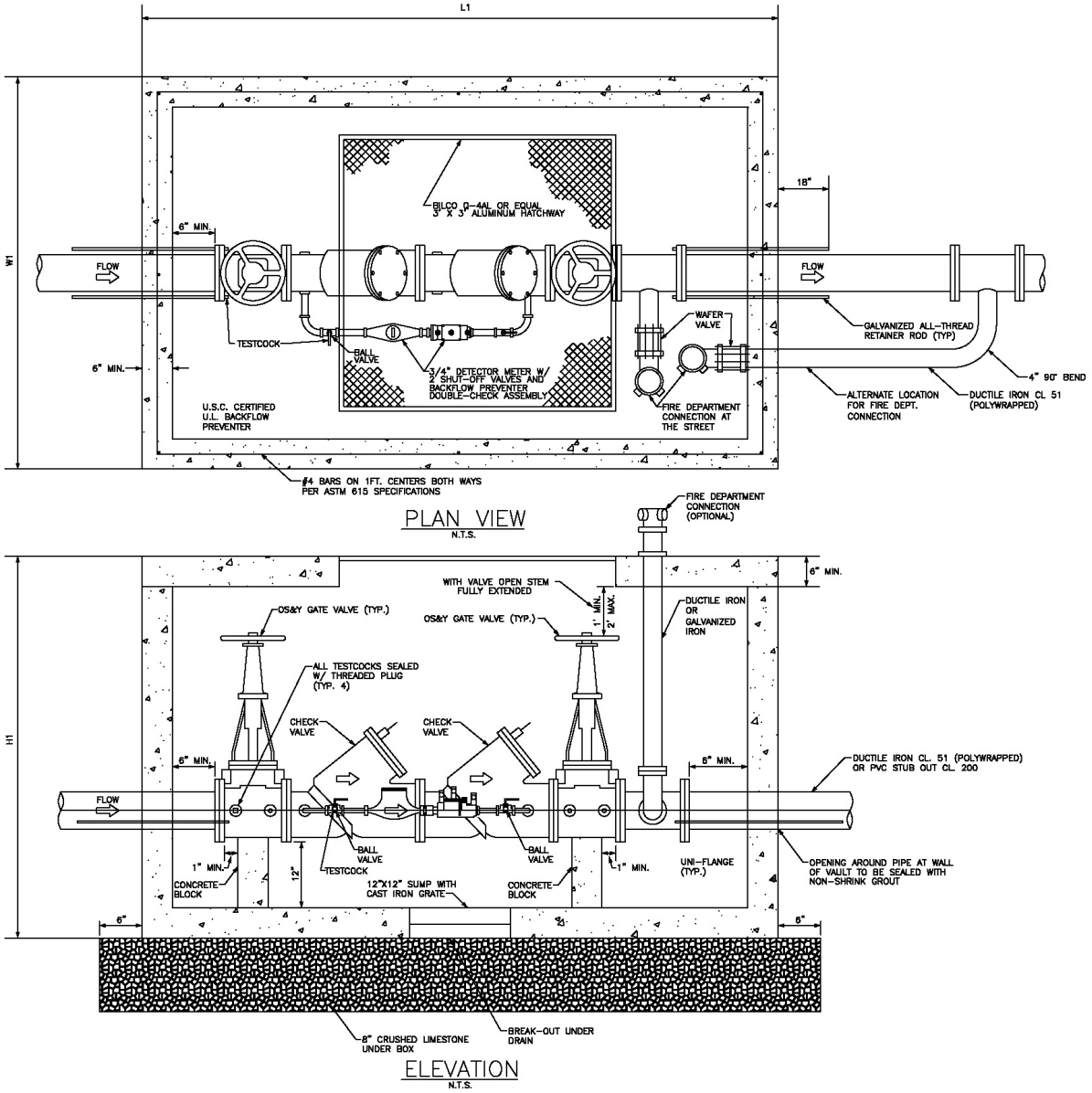
Embedment Detail
Figure 1



EMBEDMENT DETAIL & BACKFILL

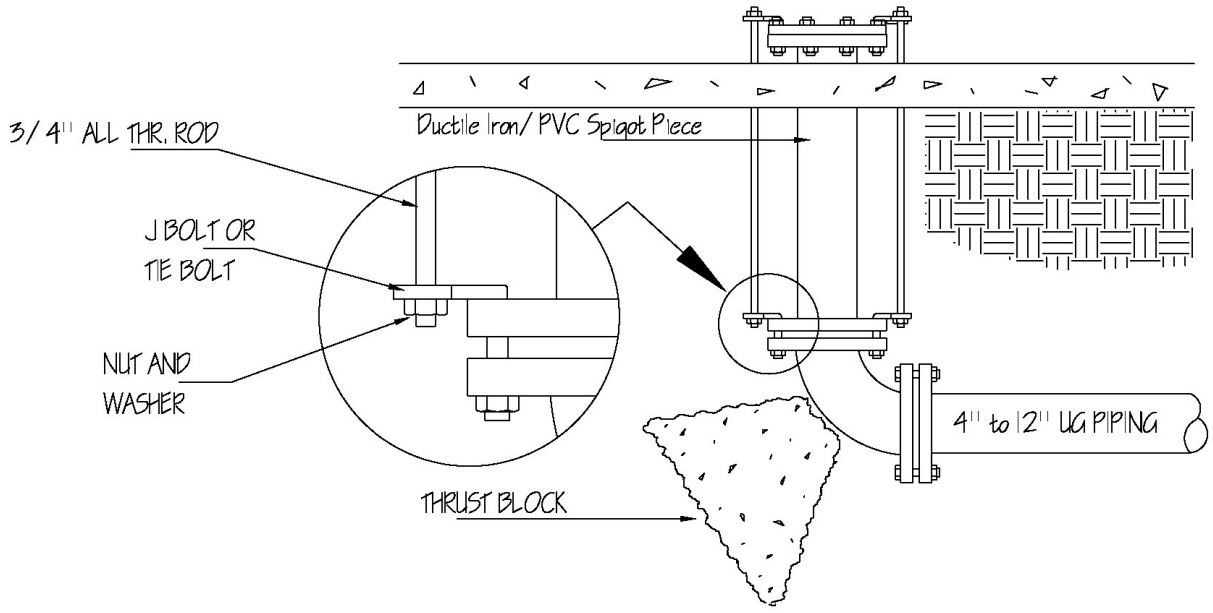
N.T.S.

Standard Details
Backflow Preventor Vault Detail
Figure 2



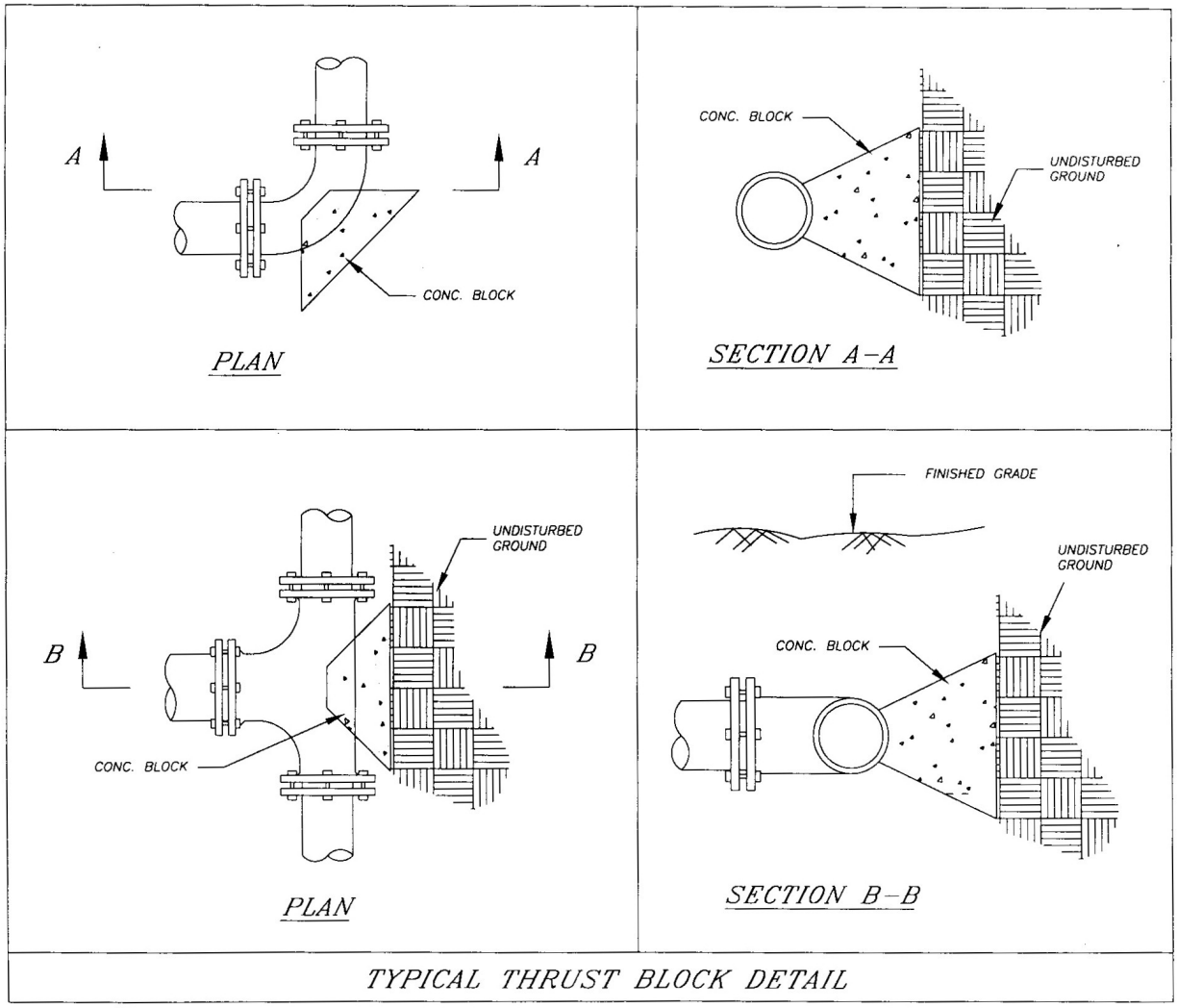
Standard Details
Spigot Detail
Figure 3

Note: Set Face of Flange Spigot a Min. of 0'-6" to Max of 1'-0" A.F.F.
and Center a Min. of 1'-6" to a Max. of 5'-0" Inside Finish Wall



Spigot Detail

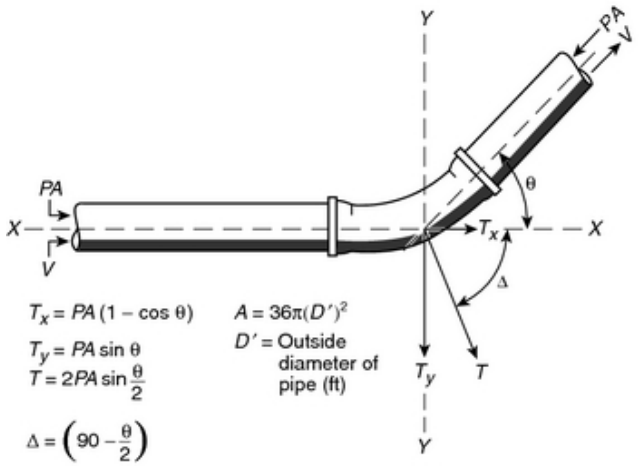
Standard Details
Thrust Block Details
Figure 4



Standard Details
Thrust Block Sizing Charts
Figure 5

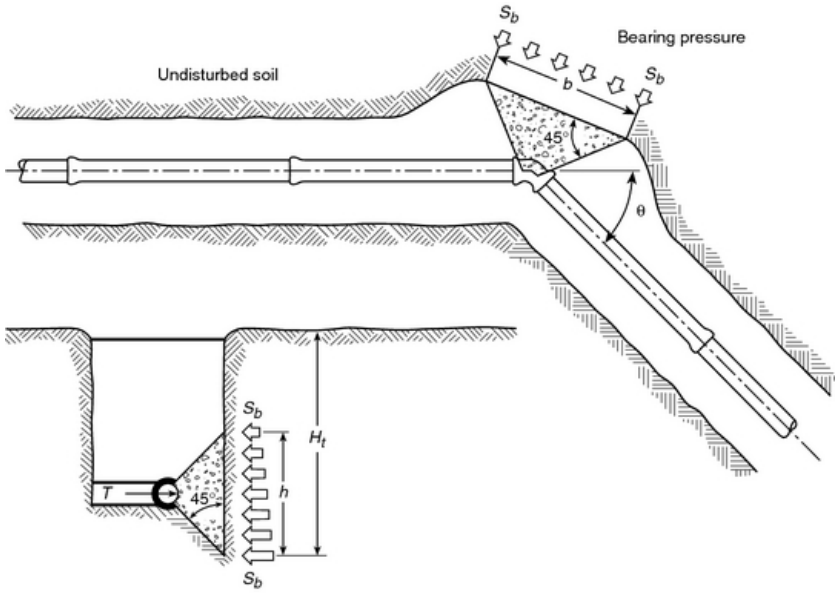
Table A.10.8.2(a) Thrust at Fittings at 100 psi (6.9 bar) Water Pressure for Ductile Iron and PVC Pipe						
Nominal Pipe Diameter (in.)	Total Pounds					
	Dead End	90 Degree Bend	45 Degree Bend	22 ½ Degree Bend	11 ¼ Degree Bend	5 1/8 Degree Bend
4	1,810	2,559	1,385	706	355	162
6	3,739	5,288	2,862	1,459	733	334
8	6,433	9,097	4,923	2,510	1,261	575
10	9,677	13,685	7,406	3,776	1,897	865
12	13,685	19,353	10,474	5,340	2,683	1,224
14	18,385	26,001	14,072	7,174	3,604	1,644
16	23,779	33,628	18,199	9,278	4,661	2,126
18	29,865	42,235	22,858	11,653	5,855	2,670
20	36,644	51,822	28,046	14,298	7,183	3,277
24	52,279	73,934	40,013	20,398	10,249	4,675
30	80,425	113,738	61,554	31,380	15,766	7,191
36	115,209	162,931	88,177	44,952	22,585	10,302
42	155,528	219,950	119,036	60,684	30,489	13,907
48	202,683	286,637	155,127	79,083	39,733	18,124
Notes: (1) For SI units, 1 lb = 0.454 kg. (2) To determine thrust at pressure other than 100 psi (6.9 bar), multiply the thrust obtained in the table by the ratio of the						

Table A.10.8.2(b) Horizontal Bearing Strengths		
	Bearing Strength (S_b)	
Soil	**lb/ft^2**	**kN/m^2**
Muck	0	0
Soft clay	1000	47.9
Silt	1500	71.8
Sandy silt	3000	143.6
Sand	4000	191.5
Sand clay	6000	287.3
Hard clay	9000	430.9
Note: Although the bearing strength values in this table have been used successfully in the design of thrust blocks and are considered to be conservative, their accuracy is totally dependent on accurate soil identification and evaluation. The ultimate responsibility for selecting the proper bearing strength of a particular soil type must rest with the design engineer.		



T = Thrust force resulting from change in direction of flow (lbf)
T_x = Component of the thrust force acting parallel to the original direction of flow (lbf)
T_y = Component of the thrust force acting perpendicular to the original direction of flow (lbf)
P = Water pressure (psi²)
A = Cross-sectional area of the pipe based on outside diameter (in.²)
V = Velocity in direction of flow

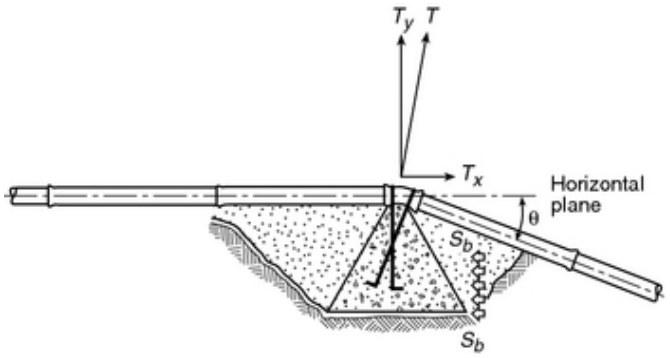
FIGURE A.10.8.2(a) Thrust Forces Acting on a Bend.



T = thrust force resulting from the change in direction of flow
S_b = horizontal bearing strength of the soil
h = block height
H_t = total depth to bottom of block

FIGURE A.10.8.2(b) Bearing Thrust Block.

Standard Details
Thrust Block Details
Figure 6



T = thrust force resulting from the change of direction of flow
T_x = horizontal component of the thrust force
T_y = vertical component of the thrust force
S_b = horizontal bearing strength of the soil

FIGURE A.10.8.2(c) Gravity Thrust Block.

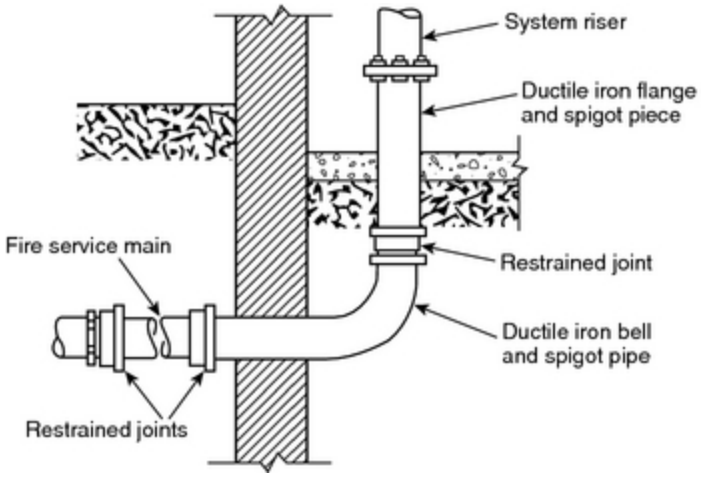


FIGURE A.10.8.3 Typical Connection to a Fire Protection System Riser Illustrating Restrained Joints.

Section 4
New Fire Sprinkler Aboveground System Plan Submittal Requirements

These guidelines are to be followed when a business, facility or organization proposes to install an automatic fire sprinkler system within the City of Kerrville. ***These guidelines are not to be interpreted as containing all data required for proper design, installation or approval.***

All automatic sprinkler systems for the purpose of these guidelines and any other guidelines or requirements of the Fire Marshal shall conform to the International Fire Code 2006, as adopted and amended by the City of Kerrville and NFPA 13 2010.

This guide does not replace, nor supersede any adopted codes and/or ordinances adopted by the City of Kerrville, or determinations and positions of the Fire Chief or Fire Marshal.

Performance and Installation Requirements

1. Unless specifically allowed by the International Fire Code or the International Building Code, residential sprinkler systems installed in accordance with NFPA 13D or NFPA 13R shall not be recognized for the purposes of exceptions or reductions, commonly referred to as "trade-offs", permitted by other requirements of this code. In addition, residential sprinkler systems installed in accordance with NFPA 13R, must include attic sprinkler protection to be recognized for the purposes of such trade-offs permitted by other requirements of this code.
2. When determining the requirement for sprinkler protection, the total area under any roof overhangs, canopies, projections, or other permanent vertical structures, beyond that of the building footprint, is include the total area determination. EXAMPLE: A proposed building area is 5,800 sq. ft. Multiple canopies are indicated to cover the entrances. The total square footage of the canopies is 300 sq. ft. The total building area is calculated as: 5,800 sq. ft. + 300 sq. ft. = 6,100 sq. ft. Therefore this building would require an automatic sprinkler system.
3. Automatic sprinkler systems shall be designed with a minimum 10 PSI safety factor with a 20 psi residual on City water mains.
4. Automatic Sprinkler System Room Access. Sprinkler system risers providing protection for buildings with multiple tenant spaces must be located in a ground floor room directly accessible from the exterior. The door must be labeled as the riser room.
5. Sprinkler systems for all strip retail centers, multiple tenant buildings, speculative warehouses, or any other multiple tenant building, regardless of ceiling height, shall be designed to provide a minimum of Ordinary Hazard Group 2.
6. All valves controlling the water supply for automatic sprinkler systems and water-flow switches on all sprinkler systems and standpipe systems, with the exception of fire department hose connections, shall be electrically supervised. (IFC 903.4 & 905.9)
7. Approved, supervised, indicating control valves shall be provided at the point of connection to the riser on each floor in high-rise buildings.
8. An approved, audible/visual device shall be connected to every automatic sprinkler system. (IFC 903.4.2)
9. An approved, weatherproof, audible/visual device shall be provided on the exterior of the building in an approved location. This device shall be a minimum of 75 candela. (IFC 903.4.2)
10. The time delay feature on the flow switch switches must be set to a delay of 90 seconds or less.
11. Sprinkler and standpipe system water-flow detectors shall be provided for each floor tap to the sprinkler system and shall cause an alarm upon detection of water flow for no more than 90 seconds.
12. The Fire Department Connection (FDC) must be within 75 ft of a fire hydrant.
13. The FDC must be at a remote location to the building adjacent to the fire lane, unless otherwise approved by the Fire Marshal's Office. *(See Fire Department Connections Section)*
14. The FDC shall be clear and unobstructed with a minimum of a 5 foot clear all weather path from fire lane access and no higher than 48 in. above grade.

15. Inspector test connections, drains, and ball-drips shall be piped directly to the exterior.
16. Riser rooms shall be permanently heated, and such heating appliances shall be hard-wired to the building electrical distribution system. Heating devices shall not be provided with an on/off switch.
17. All riser rooms shall be large enough to accommodate maintenance and testing activities, but shall be no smaller than 6 ft. by 6 ft.
18. All inspectors' test, ball-drips, and main-drains shall be piped directly to the outside of the building.
19. At least one inspection test valve (ITC) shall be located at the remote system area for each system. It is not permitted to install the ITC at the riser assembly.
20. Dry-system air compressors shall be hard wired.
21. Pre-action system solenoids shall be wired for alarm activation upon AC current loss.
22. **Do not stack the riser until the underground hydrostatic test, visual and flushing has been completed.**

Self-Service Storage Facility

23. An automatic sprinkler system shall be installed throughout all self-service storage facilities. A screen shall be installed of not less than one (1) inch or greater than six (6) inches in size. The screen and its supports shall be installed such that all elements are at least eighteen (18) inches below any sprinkler heads to restrict storage above that level.

Standpipes

24. Standpipe systems shall be installed in accordance with this section and NFPA 14. Manual dry standpipe systems shall be supervised with a minimum of 10 PSI and a maximum of 40 PSI air pressure with a high/low alarm.
25. In addition to the requirements of IFC Section 905.4, Class I standpipes shall also be required on all occupancies in which the distance from accessible points for the Fire Department ingress to any point in the structure exceeds two hundred fifty feet (250') along the route that a fire hose laid as measured from the fire lane. When required by this Code, standpipe connections shall be placed adjacent to all required exits to the structure and at two hundred (200') intervals along major corridors thereafter.
26. A fire pump shall be installed to provide for the necessary standpipe water supply for any building in which standpipes are required by the Fire Code or Fire Marshal.
27. In addition to the required standpipe calculation, and additional FDC calculation shall be provide to indicate the standpipes can be fed solely by the FDC. An inlet flow and pressure of 1500 GPM and 150 PSI shall be used.
28. Hose valves shall be 2 ½-inch outlet with a Knox locking cap installed .

To expedite the plan review and inspection processes, please refer to the information listed below. At a minimum, the submittal shall conform to the requirements of NFPA 13, Chapter 14, Plans and Calculations.

Where Required

29. Approved automatic sprinkler systems in new buildings and structures shall be provided in the locations described in this section. *Exception:* Spaces or areas in telecommunications buildings used exclusively for telecommunications equipment, associated electrical power distribution equipment, batteries and standby engines, provided those spaces or areas are equipped throughout with an automatic fire alarm system and are separated from the remainder of the building by fire barriers consisting of not less than 1-hour fire-resistance-rated walls and 2-hour fire-resistance-rated floor/ ceiling assemblies.
30. Group A-1.An automatic sprinkler system shall be provided for Group A-1 occupancies where one of the following conditions exists:
    a. The fire area exceeds 12,000 square feet (1115 m2);
    b. The fire area has an occupant load of 300 or more;
    c. The fire area is located on a floor other than the level of exit discharge; or
    d. The fire area contains a multi-theater complex.
31. Group A-3. An automatic sprinkler system shall be provided for Group A-3 occupancies where one of the following conditions exists:

a. The fire area exceeds 12,000 square feet (1115 m2);
b. The fire area has an occupant load of 300 or more; or
c. The fire area is located on a floor other than the level of exit discharge.
d. *Exception:* Areas used exclusively as participant sports areas where the main floor area is located at the same level as the level of exit discharge of the main entrance and exit.

32. Group A-4. An automatic sprinkler system shall be provided for Group A-4 occupancies where one of the following conditions exists:
    a. The fire area exceeds 12,000 square feet (1115 m2);
    b. The fire area has an occupant load of 300 or more; or
    c. The fire area is located on a floor other than the level of exit discharge.
    d. *Exception:* Areas used exclusively as participant sports areas where the main floor area is located at the same level as the level of exit discharge of the main entrance and exit.
33. Group A-5. An automatic sprinkler system shall be provided for Group A-5 occupancies in the following areas: concession stands, retail areas, press boxes, and other accessory use areas in excess of 1,000 square feet (93 m2).
34. Group E. An automatic sprinkler system shall be provided for Group E occupancies as follows:
    a. Throughout all Group E fire areas greater than 20,000 square feet (1858 m2) in area.
    b. Throughout every portion of educational buildings below the level of exit discharge.
    c. *Exception:* An automatic sprinkler system is not required in any fire area or area below the level of exit discharge where every classroom throughout the building has at least one exterior exit door at ground level.
35. Group F-1. An automatic sprinkler system shall be provided throughout all buildings containing a Group F-1 occupancy where one of the following conditions exists:
    a. Where a Group F-1 fire area exceeds 12,000 square feet (1115 m2);
    b. Where a Group F-1 fire area is located more than three stories above grade plane; or
    c. Where the combined area of all Group F-1 fire areas on all floors, including any mezzanines, exceeds 24,000 square feet (2230 m2).
    d. An automatic sprinkler system shall be provided throughout all Group F-1 occupancy fire areas that contain woodworking operations in excess of 2,500 square feet in area (232 m2) which generate finely divided combustible waste or which use finely divided combustible materials.
36. Group H. Automatic sprinkler systems shall be provided in high-hazard occupancies as required in IFC 2006 Sections 903.2.4.1 through 903.2.4.3. An automatic sprinkler system shall be installed in Group H occupancies.
37. Group H-5 occupancies. An automatic sprinkler system shall be installed throughout buildings containing Group H-5 occupancies. The design of the sprinkler system shall not be less than that required under the International Building Code for the occupancy hazard classifications in accordance with IFC 2006 Table 903.2.4.2.
38. Pyroxylin plastics. An automatic sprinkler system shall be provided in buildings, or portions thereof, where cellulose nitrate film or pyroxylin plastics are manufactured, stored or handled in quantities exceeding 100 pounds (45 kg).
39. Group I. An automatic sprinkler system shall be provided throughout buildings with a Group I fire area. *Exception:* An automatic sprinkler system installed in accordance with IFC 2006 Section 903.3.1.2 or 903.3.1.3 shall be allowed in Group I-1 facilities.
40. Group M. An automatic sprinkler system shall be provided throughout buildings containing a Group M occupancy where one of the following conditions exists:
    a. Where a Group M fire area exceeds 12,000 square feet (1115 m2);
    b. Where a Group M fire area is located more than three stories above grade plane; or
    c. Where the combined area of all Group M fire areas on all floors, including any mezzanines, exceeds 24,000 square feet (2230 m2).
41. High-piled storage. An automatic sprinkler system shall be provided as required in IFC 2006 Chapter 23 in all buildings of Group M where storage of merchandise is in high-piled or rack storage arrays.
42. Group S-1. An automatic sprinkler system shall be provided throughout all buildings containing a Group S-1 occupancy where one of the following conditions exists:
    a. A Group S-1 fire area exceeds 12,000 square feet (1115 m2);
    b. A Group S-1 fire area is located more than three stories above grade plane; or

    c. The combined area of all Group S-1 fire areas on all floors, including any mezzanines, exceeds 24,000 square feet (2230 m2).
43. Repair garages. An automatic sprinkler system shall be provided throughout all buildings used as repair garages in accordance with the International Building Code, as follows:
    a. Buildings two or more stories in height, including basements, with a fire area containing a repair garage exceeding 10,000 square feet (929 m2).
    b. One-story buildings with a fire area containing a repair garage exceeding 12,000 square feet (1115 m2).
    c. Buildings with a repair garage servicing vehicles parked in the basement.
44. Bulk storage of tires. Buildings and structures where the area for the storage of tires exceeds 20,000 cubic feet (566 m3) shall be equipped throughout with an automatic sprinkler system in accordance with IFC 2006 Section 903.3.1.1.
45. Group S-2. An automatic sprinkler system shall be provided throughout buildings classified as enclosed parking garages in accordance with IFC 2006 Section 406.4 of the International Building Code or where located beneath other groups. *Exception:* Enclosed parking garages located beneath Group R-3 occupancies.
46. Commercial parking garages. An automatic sprinkler system shall be provided throughout buildings used for storage of commercial trucks or buses where the fire area exceeds 5,000 square feet (464 m2).
47. Windowless stories in all occupancies. An automatic sprinkler system shall be installed in the locations set forth in IFC 2006 Sections 903.2.10.1 through 903.2.10.1.3. *Exception:* Group R-3 and Group U.
48. Stories and basements without openings. An automatic sprinkler system shall be installed in every story or basement of all buildings where the floor area exceeds 1,500 square feet (139.4 m2) and where there is not provided at least one of the following types of exterior wall openings:
    a. Openings below grade that lead directly to ground level by an exterior stairway complying with Section 1009 or an outside ramp complying with IFC 2006 Section 1010. Openings shall be located in each 50 linear feet (15 240 mm), or fraction thereof, of exterior wall in the story on at least one side.
    b. Openings entirely above the adjoining ground level totaling at least 20 square feet (1.86 m2) in each 50 linear feet (15 240 mm), or fraction thereof, of exterior wall in the story on at least one side.
49. Opening dimensions and access. Openings shall have a minimum dimension of not less than 30 inches (762 mm). Such openings shall be accessible to the fire department from the exterior and shall not be obstructed in a manner that fire fighting or rescue cannot be accomplished from the exterior.
50. Openings on one side only. Where openings in a story are provided on only one side and the opposite wall of such story is more than 75 feet (22 860 mm) from such openings, the story shall be equipped throughout with an approved automatic sprinkler system or openings as specified above shall be provided on at least two sides of the story.
51. Basements. Where any portion of a basement is located more than 75 feet (22 860 mm) from openings required by IFC 2006 Section 903.2.10.1, the basement shall be equipped throughout with an approved automatic sprinkler system.
52. Rubbish and linen chutes. An automatic sprinkler system shall be installed at the top of rubbish and linen chutes and in their terminal rooms. Chutes extending through three or more floors shall have additional sprinkler heads installed within such chutes at alternate floors. Chute sprinklers shall be accessible for servicing.
53. Buildings 55 feet or more in height. An automatic sprinkler system shall be installed throughout buildings with a floor level having an occupant load of 30 or more that is located 55 feet (16 764 mm) or more above the lowest level of fire department vehicle access. Exceptions:
    a. Airport control towers.
    b. Open parking structures.
    c. Occupancies in Group F-2.
54. During construction. Automatic sprinkler systems required during construction, alteration and demolition operations shall be provided in accordance with Section 1413.
55. Other hazards. Automatic sprinkler protection shall be provided for the hazards indicated in IFC 2006 Sections 903.2.12.1 and 903.2.12.2.

56. Ducts conveying hazardous exhausts. Where required by the International Mechanical Code, automatic sprinklers shall be provided in ducts conveying hazardous exhaust, flammable or combustible materials. *Exception:* Ducts where the largest cross-sectional diameter of the duct is less than 10 inches (254 mm).
57. Commercial cooking operations. An automatic sprinkler system shall be installed in a commercial kitchen exhaust hood and duct system where an automatic sprinkler system is used to comply with IFC 2006 Section 904.
58. Other required suppression systems. In addition to the requirements of IFC 2006 Section 903.2, the provisions indicated in IFC 2006 Table 903.2.13 also require the installation of a suppression system for certain buildings and areas.

Submittal Requirements

59. Faxed plans submittals will not be accepted.
60. A "Wet" RME signature and stamp, is required on all plan drawings and calculations.
61. Copy of Contractors Texas Department of Insurance License and Liability Insurance with the city of Kerrville as the certificate holder.
62. Plans shall be clear and legible and all sheets shall be in a common and appropriate scale.
63. A minimum of two (2) sets of plans shall be submitted. One set of plans and details to be in PDF Format and the second set on paper to be reviewed. Plans shall contain sufficient detail to enable the plan reviewer to accomplish a complete review. The following information shall be provided on the plans;
64. Floor plan.
65. Square footage.
66. Location of doors.
67. Intended use of each room is identified.
68. North arrow provided.
69. Location of the Fire Department Connection (FDC).
70. Occupancy classification.
71. Scope of Work.
72. Site plan to include the all fire hydrants, fire lanes, fire department connections and the fire service lead-in.
73. Equipment List.
74. Hydraulic calculations for each design area.
75. A minimum of one (1) set of data specifications sheets for all equipment shall be provided.
76. Specific materials in the specification booklet are to be identified by an arrow or highlighter.
77. A complete full-height cross section of the building.
78. Area of coverage of each sprinkler head.
79. Total area protected by each system.
80. Capacity of the dry system or antifreeze system.
81. Hydraulic node symbols and schedule.
82. Indicate all Riser Nipples (RN) or Drop Nipples (DN).
83. Elevations of sprinkler lines and node points.
84. Hanger details.
85. Hanger locations.
86. Sprinkler riser diagram.
87. Inspectors test connection detail.
88. Auxiliary drain details.
89. Size and location of standpipe hose stations, if applicable.
90. Graphical scale.
91. Description of the design area.
92. Design density of each design area.
93. Clearly indicate each remote area.
94. Provide graphic representation of the waterflow analysis.
95. Provide the water supply test information.
96. Provide notes to indicate the following;
97. Design code.

98. Responsible party with regards to freeze protection. If to be provided by others, indicate and provide drawings to indicate the heaters with your submittal.
99. The title block shall contain the following;
100. Location of the installation.
101. Name and complete address of the business.
100. Name and complete address of the installing company.
101. Licensing information.
102. "Wet" signature of the RME.
103. Date.
104. Drawn by.
105. Authority Having Jurisdiction.
106. Scale.
107. A legend shall be provided to include;
108. Symbol, sprinkler description, manufacturer, model number, and quantity for each device.
109. Pipe and fittings type.

General Requirements

110. Each submittal shall have a completed: Kerrville Fire Marshal Plan Review/Permit Application
111. Plans approved by the Fire Marshal's Office give authorization for construction and/or operation. Final approvals are subject to field verification. Any approval issued by the Fire Marshal's Office does not release the contractor or property owner from the responsibility of full compliance with all applicable codes and ordinances relating to the construction project.
112. Installation, fabrication or otherwise construction of the system is prohibited without approved plans and permit.
113. All installations and/or operations must concur with the approved plans. Any deviation from the approved plans requires a re-submittal to the Fire Marshal's Office.
114. All fire department inspection forms and permits shall be kept in a permit packet on the job site until final inspection.

High-Piled Rack Storage

115. For any building with a clear height exceeding 12 feet (4572 mm), see IFC 2006 Chapter 23 to determine if those provisions apply.
116. For any building with a clear height in excess of 12 feet, the sprinkler system shall be designed to the maximum allowable storage height for Class IV commodities.
117. A rack storage plan is required prior to fire sprinkler plan approval for any building in which high-piled storage will take place.

Backflow Prevention

118. All fire sprinkler systems are required to be provided with an approved method of backflow prevention.
119. Double Detector Check/Backflow Preventer is required on all systems. Installation is preferred inside the building.
120. The City of Kerrville Building Department shall determine the final location of the backflow assembly. As a general rule, if the fire service lead-in is less than 100 ft. in total length, then the assembly may be located within the riser room. If the fire service lead-in is over 100 ft in total length, then the assembly must me located in a vault adjacent to the tap, preferable in an easement. Contact the Engineering Department for requirements pertaining to backflow protection.
121. A reduced pressure zone (RPZ) backflow prevention device is required on antifreeze systems.
122. Assemblies shall be listed for fire protection use.
123. Assemblies must be capable of being electronically monitored.
124. Assemblies must be provided with a bypass valve.

Inspection Requirements

125. **Do not stack the riser until the underground hydrostatic test, visual and flushing has been completed.**
126. Visual: **All aboveground piping and joints must be uncovered and exposed, with labeling of the pipe legible from the floor.** All hangers will be visually inspected and must be uncovered and exposed to the floor. Failure to comply with this requirement can result in a failure of the system and covering material will have to be removed prior to an additional examination.
127. Aboveground Hydrostatic Test: Aboveground piping will be visually inspected with all joints exposed and labeling of the pipe turned downward. The test will be at a minimum of 200 psi for two (2) hours. No more than a Plus (+) or Minus (-) of 5 psi allowed on a wet system to pass.
128. 24 Hour Air Test: The test will be conducted at 40 psi of air for twenty four (24) hours with less than 1.5 psi loss.
129. Trip Test: Operational test of the dry pipe valve is performed and the quick opening device (500 + gallon systems) is tested, 750 = gallon systems must trip within sixty (60) seconds.
130. Compressor Test: Dry system compressor fills the system within 30 seconds.
131. Riser Main Flush: Upon completion of the aboveground hydrostatic test, aboveground piping will be drained and witnessed by the Fire Marshal's Office.
132. Riser Room: Verify riser room requirements, including floor drain for fire pumps, heat, light, markings, spare sprinkler heads and wrench, ect.
133. Standpipe and Fire Department Connection (FDC): Hydrostatic testing if not already done, the test will be at 200 psi for a minimum of two (2) hours. +/- 5 psi allowed.
134. Fire Pump: Hydrostatic testing, if not already done will be at 200 psi for a minimum of two (2) hours. No pressure drop or gain allowed, all piping flushed, pump room requirements verified and operational test conducted by manufacture witnessed by the Fire Marshal's Office.
135. Fire Sprinkler Final: Final Fire Marshal Inspection at completion of all inspections and the receipt of all State required documents. *The inspection shall be conducted when all sheet rock and millwork is completed. The objective of this inspection is to verify that coverage is adequate after the initial hydrostatic test. This will give the Fire Marshal's Office and the contractor(s) the opportunity to make any changes before there is a request for a CO Inspection. Sprinkler heads must be clean and free from paint, construction debris or other conditions that would affect the proper operation of the sprinkler heads.*

Section 4
Fire Department Connection (FDC) Guidelines

These guidelines are to be followed when a business facility or organization proposes to install or modify a fire department connection (FDC) serving an automatic fire sprinkler system or standpipe system within the City of Kerrville. These guidelines are not to be interpreted as containing all data required for proper design, installation or approval.

All fire department connections serving an automatic fire sprinkler and/or standpipe system for the purpose of these guidelines and any other guidelines or requirements of the Fire Marshal shall conform to the International Fire Code 2006, as adopted and amended by the City of Kerrville, NFPA 13 2010 and NFPA 24 2010.

This guide does not replace, nor supersede any adopted codes and/or ordinances adopted by the City of Kerrville, or determinations and positions of the Fire Chief or Fire Marshal.

Information needed at time of site plan drawings

1. Show location of connections on site plan.

Information needed at time of construction drawings

2. FDC's for automatic sprinkler systems and/or standpipe systems for new buildings should be equipped with a 5 inch Storz connection. A 2 ½ inch Siamese connection will be allowed on systems that are not capable of having a 5 inch Storz connection (with Fire Marshal approval). The Storz connection shall be at a short bend downward (30 degree bend) and equipped with a locking Storz cap. The 2 ½ in Siamese connection will also be equipped with two (2) locking caps.
3. There shall be a check valve located behind both connections.
4. FDC shall be facing and visible from the fire lane. FDC shall be located at a distance of 1 ½ times of the building or structure height, located at remote location. The FDC shall be located at a minimum forty (40) feet away from the building or structure. Location to be approved by the Fire Marshal.
5. FDC must be located within 75 feet of a fire hydrant and 25 feet of a fire lane.
6. The FDC shall be clear and unobstructed with a minimum of a 5 foot clear all weather path from fire lane access.
7. FDC installed in a yard should have a 4 foot x 4 foot x 4 inch concrete pad placed at the base to provide additional stability.
8. The FDC shall be installed no higher than 48 inches above grade.
9. Fire hose threads used shall be national standard hose thread.
10. Underground piping shall be designed and constructed as required for an underground fire main using NFPA 24, Standard for the Installation of Private Fire Service Mains and Their Appurtenances, as the installation standard.
11. The FDC shall discharge into the system on the discharge side of the fire pump if a fire pump is present.
12. Where the FDC is subject to vehicular damage, the connection shall be protected. Protection components shall be no closer than 3 feet to the connection and shall not interfere with the operation of the connection.
13. The pipe size and arrangement of the Fire Department Connection should conform to the latest edition of NFPA 13, Standard for the Installation of Sprinkler Systems.
14. FDC signs are required for each FDC connection. *See Appendix for FDC Sign specifications.*

Section 4
Fire Pump Guidelines

These guidelines are to be followed when a business, facility, or organization proposes to install or modify a fire pump serving an automatic fire sprinkler system within the City of Kerrville. These guidelines are not to be interpreted as containing all data required for proper design, installation, or approval.

All fire pumps serving an automatic fire sprinkler system for the purposes of these guidelines and any other guidelines or requirements of the Fire Marshal shall conform to the International Fire Code 2006, as adopted and amended by the City of Kerrville and NFPA 20 2010.

This guide does not replace, nor supersede any adopted codes and/or ordinances adopted by the City of Kerrville, or determinations and positions of the Fire Chief or Fire Marshal.

Fire Pump Room

1. The fire pump room must be separated from all other spaces of the building by two hour rated construction. The rating may be reduced to 1-hour if the building is fully sprinklered with a NFPA 13 system.
2. Provide heat, lighting, emergency lighting, ventilation, and a floor drain in the pump room.
3. Suitable means shall be provided for maintaining the temperature of a pump room or pump house, where required, above 40°F (5°C).
4. Temperature of the pump room, pump house or area where engines are installed shall never be less than the minimum recommended by the engine manufacturer.
5. The fire pump room shall be provided with an exterior fire department access door that is not less than 3 ft. in width and 6 ft. – 8 in. in height, regardless of any interior doors that are provided.
6. A Knox key box shall be provided at this door.
7. Entry doors to pump rooms or pump houses shall be clearly identified with durable stating "FIRE PUMP ROOM." A minimum four (4) inch tall red letters on a contrasting background shall be used. the sign shall be mounted on the exterior of the access doors.
8. Pump room dimensions for electric drive shall be a room with a minimum of 196 sq (14 feet by 14 feet) unless otherwise approved by fire marshal.
9. Pump room dimensions for diesel drive shall be a room with a minimum of 256 sq (16 feet by 16 feet) unless otherwise approved by fire marshal.
    a. The fuel tank shall be located on an exterior wall, adjacent to the exterior door.
    b. The fill pipe shall be extended to the exterior of the pump room.
10. There shall be no obstructions between fire lane and pump room doors including vehicle parking.
11. Fire pump rooms shall be posted with "NO STORAGE BY ORDER OF THE FIRE MARSHAL".
12. Fire pump room doors shall be secured from unauthorized entry.
13. Fire pump rooms shall be provided with automatic sprinkler protection.
14. High voltage wiring associated with the fire pump, jockey pump, and controllers shall be located within rigid, intermediate, or liquid tight conduit.
15. A 4A-60BC rated fire extinguisher shall be provided within the fire pump room.

Foundation and Setting

16. The pump and driver shall be mounted on a common base plate designed and installed in accordance with the manufacturer's specifications and NFPA standards.

Fire Pump Control Valves and Piping

17. All valves including, the fire pump suction, discharge and bypass valves, and the isolation valves on the backflow prevention device or assembly and all other control valves shall be electronically supervised by the building fire alarm system and locked in the open position.
18. Fire pump controller signals shall be electronically supervised by the building fire alarm system.
19. Fire pump piping shall be painted with a rust inhibiting paint. Red is the recommended color.

20. Fire pump test headers shall be provided and they shall be located on an exterior wall adjacent to the pump room.
21. Fire pump test headers shall be equipped with a control valve within the fire pump room. This valve shall be electronically supervised by the building fire alarm system in the normally closed position.

Fire Pump Power Supply

22. If an electric fire pump, a secondary direct utility feed will be required to the pump controller. This feed must be circumvent the primary utility feed disconnect.
23. Power for electric motor driven fire pumps must be from a reliable source or two or more independent sources, all of which must be in compliance with NFPA 20 6-2.
24. Where multiple electric power sources are provided, they shall be arranged so that a fire at one source will not cause an interruption at the other source. [NFPA 20 6-2.4.1]
25. Where power is supplied by a service, it must be arranged to minimize the possibility of damage by fire. [NFPA 20 6-2.1 and .2] Service-entrance conductors or fire pump feeder conductors must be physically routed outside the building and must be installed as service-entrance conductors in compliance with NFPA 70 Article 230. When routed through or under the building, it must be encased in concrete at least 2" thick. [NEC 695.6 (A), 230.6 (1), and (2)]
26. The power supply feeding the fire pump and accessories must be dedicated, and directly connected with no disconnect device to the power source. [NFPA 20 6-2, 6-3 and A-6-2.3] Except that a single disconnecting means and associated over-current protective device is permitted between a power source remote from the fire pump room and controller or transfer switch or listed combination of both. [NFPA 20 9- 3.7.7.3] This disconnect must be supervised. [NFPA 20 6-3.2.2.2]
27. Where alternate power is supplied by an on-site generator, the generator must be located and protected in accordance with 6-2.1 and Section 6-6. [NFPA 20 6-2.4.2]
28. All controllers must be located close to the motor with access for servicing. [NFPA 20 7- 2.1]
29. Transfer of power to the fire pump controller between the normal supply and the alternate supply must take place within the fire pump room. [NFPA 20 6-6.4]
30. Manual transfer switches may not be used to transfer power to the fire pump controller. [NFPA 20 7-8.1.2]
31. A fire pump controller may not be used as a junction box to supply other equipment (jockey or make-up controllers). [NFPA 20 7-3.4.4]
32. No remote device may be installed that will prevent automatic operation of the transfer switch. [NFPA 20 7-8.1.3]
33. All pump room wiring must be in rigid, intermediate, or liquid tight flexible metal conduit, LFNC-B or Type MI cable or other approved means. [NFPA 70 695.6(e)]
34. The controller must have connections to provide an audible or visual alarm in a constantly attended location for the following conditions [NFPA 20 7-4.7]:
    a. Controller has operated into a motor running condition.
    b. Loss of power to one of the phases on the line side of the motor contactor.
    c. Phase reversal on the line side of the motor contactor.
35. Dry-type transformers installed indoors and rated 112 1/2 kVA or less shall have a separation of at least 305 mm (12 in.) from combustible material unless separated from the combustible material by a fire-resistant, heat-insulated barrier. [NFPA 70 450.21]
36. Individual dry-type transformers of more than 112 1/2 kVA rating shall be installed in a transformer room of fire-resistant construction. Unless specified otherwise in this article, the term fire resistant means a construction having a minimum fire rating of 1 hour unless either exception apply. [NFPA 70 450.21]
37. Electrical equipment rated for 1200 amperes or more and over 6 ft (1.83 m) wide, containing over-current devices, switching devices, or control devices, there shall be one entrance not less than 32 in. (810 mm) wide and 6 1/2 ft (1.98 m) high at each end of the working space. [NFPA 70 110-26 C (2). Both entrances shall open in the direction of the egress and be equipped with panic bars, pressure plates, or other devices that are normally latched but open under simple pressure. [2002 NFPA 70 110.26.C(2) and 2003 NFPA 101 7.2.1.2.4]
38. Individual dry-type transformers of more than 112 1/2 kVA rating shall be installed in a transformer room of minimum 1 hour fire-resistant construction, unless specified otherwise in article 2002 NFPA 70 450.21(B).

Section 4
Standpipe Guidelines

These guidelines are to be followed when a business, facility, or organization proposes to install or modify a standpipe system within the City of Kerrville. These guidelines are not to be interpreted as containing all data required for proper design, installation, or approval.

All standpipe systems for the purposes of these guidelines and any other guidelines or requirements of the Fire Marshal shall conform to the International Fire Code 2006, as adopted and amended by the City of Kerrville, NFPA 13 2010 and NFPA 14 2007.

This guide does not replace, nor supersede any adopted codes and/or ordinances adopted by the City of Kerrville, or determinations and positions of the Fire Chief or Fire Marshal.

Where Required

1. In buildings exceeding 10,000 square feet in area per story, Class I semi-automatic or automatic standpipes shall be provided where any portion of the building's interior area is more than 150 feet of travel, vertically and horizontally, from the nearest point of fire department vehicle access.
2. Class I standpipe systems shall be installed throughout buildings where the floor level of the highest story is located more than 30 feet (9144 mm) above the lowest level of the fire department vehicle access, or where the floor level of the lowest story is located more than 30 feet (9144 mm) below the highest level of fire department vehicle access.
3. Class I manual dry standpipes are allowed in open parking garages that are subject to freezing temperatures, provided that the hose connections are located so that all portions of the building are within 30 feet (9144 mm) of a nozzle attached to 100 feet (30 480 mm) of hose.
4. Class I automatic wet standpipes shall be provided in nonsprinklered Group A buildings having an occupant load exceeding 1,000 persons.
   Exceptions:
   a. Open-air-seating spaces without enclosed spaces.
   b. Class I automatic dry and semiautomatic dry standpipes or manual wet standpipes are allowed in buildings where the highest floor surface used for human occupancy is 75 feet (22 860 mm) or less above the lowest level of fire department vehicle access.
5. A covered mall building shall be equipped throughout with a standpipe system where required by the International Fire Code 2006 Section 905.3.1. Covered mall buildings not required to be equipped with a standpipe system by the International Fire Code 2006 Section 905.3.1 shall be equipped with Class I hose connections connected to a system sized to deliver water at 250 gallons per minute (946.4 L/min) at the most hydraulically remote outlet. Hose connections shall be provided at each of the following locations:
   a. Within the mall at the entrance to each exit passageway or corridor.
   b. At each floor-level landing within enclosed stairways opening directly on the mall.
   c. At exterior public entrances to the mall.
6. Stages greater than 1,000 square feet (93 m2) in area shall be equipped with a Class I wet standpipe system with hose connections on each side of the stage.
7. Underground buildings shall be equipped throughout with a Class I automatic wet or manual wet standpipe system.
8. Buildings with a helistop or heliport that are equipped with a standpipe shall extend the standpipe to the roof level on which the helistop or heliport is located in accordance with the International Fire Code 2006 Section 1107.5.
9. Marinas and boatyards shall be equipped throughout with standpipe systems in accordance with NFPA 303.

General Requirements

10. Fire hose threads used in connection with standpipe systems shall be approved and shall be compatible with fire department hose threads. The location of fire department hose connections shall be approved.
11. In buildings used for high-piled combustible storage, fire protection shall be in accordance with Chapter 23 of the International Fire Code 2006.
12. Standpipe systems are allowed to be combined with automatic sprinkler systems.
13. Dry standpipes shall not be installed except where subject to freezing and in accordance with NFPA 14.
14. Manual dry standpipe systems shall be supervised with a minimum of 10 psig and a maximum of 40 psig air pressure with a high/low alarm.
15. Hose valves shall be 2 1/2-inch with a locking cap installed.
16. National Standard Thread (NST) shall be provided.
17. Standpipe systems required during construction and demolition operations shall be provided in accordance with the International Fire Code 2006 Section 1413. See *General Construction Site Guidelines* Section for further information.

Location of Class I Standpipe Hose Connections

18. Class I standpipe hose connections shall be provided in all of the following locations:
    a. In every required stairway, a hose connection shall be provided for each floor level above or below grade. Hose connections shall be located at an intermediate floor level landing between floors, unless otherwise approved by the fire code official.
    b. On each side of the wall adjacent to the exit opening of a horizontal exit. *Exception:* Where floor areas adjacent to a horizontal exit are reachable from exit stairway hose connections by a 30-foot (9144 mm) hose stream from a nozzle attached to 100 feet (30480 mm) of hose, a hose connection shall not be required at the horizontal exit.
    c. In every exit passageway, at the entrance from the exit passageway to other areas of a building.
    d. In covered mall buildings, adjacent to each exterior public entrance to the mall and adjacent to each entrance from an exit passageway or exit corridor to the mall.
    e. Where the roof has a slope less than four units vertical in 12 units horizontal (33.3-percent slope), each standpipe shall be provided with a two-way hose connection located either on the roof or at the highest landing of a stairway with stair access to the roof. An additional hose connection shall be provided at the top of the most hydraulically remote standpipe for testing purposes.
    f. Where the most remote portion of a nonsprinklered floor or story is more than 150 feet (45 720 mm) from a hose connection or the most remote portion of a sprinklered floor or story is more than 200 feet (60 960 mm) from a hose connection, the fire code official is authorized to require that additional hose connections be provided in approved locations.
19. Risers and laterals of Class I standpipe systems in non-sprinklered buildings that are not located within an enclosed stairway or pressurized enclosure shall be protected by a degree of fire resistance equal to that required for vertical enclosures in the building in which they are located.
20. In buildings where more than one standpipe is provided, the standpipes shall be interconnected in accordance with NFPA 14.
21. In Group A-1 and A-2 occupancies with occupant loads of more than 1,000, hose connections shall be located on each side of any stage, on each side of the rear of the auditorium, on each side of the balcony, and on each tier of dressing rooms.

Cabinets

22. Cabinets containing fire-fighting equipment, such as standpipes, fire hose, fire extinguishers or fire department valves, shall not be blocked from use or obscured from view.
23. Cabinets shall be identified in an approved manner by a permanently attached sign with letters not less than 2 inches (51 mm) high in a color that contrasts with the background color, indicating the equipment contained therein.
24. Doors not large enough to accommodate a written sign shall be marked with a permanently attached pictogram of the equipment contained therein.
25. Doors that have either an approved visual identification clear glass panel or a complete glass door panel are not required to be marked.

26. Cabinets shall be unlocked unless the visual identification panels of glass or other approved transparent frangible material that is easily broken and allows access.

Mid Rise Residential Building

27. For residential structures, three or more stories in height, but not classified as a high-rise, see *Mid-Rise Building Construction Policy* for additional requirements.

Monitoring

28. See *Monitoring of Fire Alarm/Fire Sprinkler Systems* Section for requirements.

Section 4
Fire Sprinkler Aboveground Systems
Tenant Finish – Out/Building Alteration

These guidelines are to be followed when a business, facility, or organization proposes to modify an automatic fire sprinkler system within the City of Kerrville. These guidelines are not to be interpreted as containing all data required for proper design, installation, or approval.

All automatic fire sprinkler system for the purposes of these guidelines and any other guidelines or requirements of the Fire Marshal shall conform to the International Fire Code 2006, as adopted and amended by the City of Kerrville and NFPA 13 2010.

This guide does not replace, nor supersede any adopted codes and/or ordinances adopted by the City of Kerrville, or determinations and positions of the Fire Chief or Fire Marshal.

General Requirements
Please see the Aboveground Sprinkler System Plan Submittal Requirements for additional information.
A permit is required for all modifications of an existing or new sprinkler system.

Submittal Requirements
1. A minimum of two (2) sets of plans and minimum of one (1) set of plans and specifications/cut sheets shall be submitted in PDF Format. The second set of plans shall be submitted on paper. Plans shall contain sufficient detail to enable the plan reviewer to accomplish a complete review.
2. Hydraulic calculations will be required if the area(s) to be modified are within the original design area and/or the modifications proposed to create a higher hazard classification or as determined by the Fire Marshal. A minimum of one (1) set of hydraulic calculations shall be provided.
3. Each submittal shall have a:
    a. Kerrville Fire Marshal Fire Protection System Permit for Sprinkler System
    b. A copy of State of Texas Fire Sprinkler RME-General license is required for the installing contractor.
    c. If System is designed by a PE: A State of Texas Engineers stamp is required on all pages
    d. A copy of State of Texas Fire Sprinkler SCR license is required for the installing company.
    e. A copy of liability insurance with the City of Kerrville listed as the “Certificate Holder”.
4. Plans shall be clear and legible and all sheets shall be in a common and appropriate scale.
5. The following information shall be provided on the plans:
    a. “Wet” RME signature
    b. The title block shall contain the following:
        1. Location of the installation
        2. Name and complete address of the business
        3. Name and complete address of the installing company
        4. Licensing information
        5. Date
        6. Drawn by
        7. Building permit number
        8. Authority Having Jurisdiction as the City of Kerrville
        9. Designed in accordance with the International Fire Code 2006, and NFPA 13, 2007
    c. Floor plan
    d. Square footage
    e. Intended use of each room is identified
    f. Occupancy classification and type of hazard (i.e. light, ordinary)
    g. Scope of Work
    h. Site plan to indicate where, in the building, the modification is to be performed. Cloud area or otherwise indicate
    i. Indicate what piping is new and existing
    j. Type of sprinkler heads

k. Area of coverage per sprinkler head
l. Hanger locations
m. Design standard used
n. An equipment legend shall be provided to include:
    1. Symbol, sprinkler description, manufacturer, model number, and quantity for each device
    2. Pipe and fittings type
    3. Indicate which sprinkler heads are new, existing, and relocated

6. Specification booklet shall contain the following:
    a. Scope of Work.
    b. Equipment List
    c. Hydraulic calculations for each design area. (If required)
    d. Specific materials in the specification booklet are to be identified by an arrow or highlighter
7. Hydraulic Calculations shall include:
    a. "Wet" RME signature
    b. Summary sheet
    c. Water supply graph sheet
    d. Supply analysis
    e. Node analysis
    f. Worksheets

Additional Information

8. ***Plans approved by the City of Kerrville, Fire Marshal give authorization for construction and/or operation. Final approvals are subject to field verification. Any approval issued by the Fire Marshal does not release the contractor or property owner from the responsibility of full compliance with all applicable codes and ordinances relating to the construction project.***
9. ***Installation, fabrication, or otherwise construction of the system is prohibited without approved plans and permit.***
10. ***All installations and/or operations must concur with the approved plans. Any deviation from the approved plans requires a re-submittal to the Fire Marshal.***
11. ***All fire marshal inspection forms and permits shall be kept in a permit packet on the job site until final inspection.***

Section 4
Fire Alarm Systems

These guidelines are to be followed when a business, facility, or organization proposes to install a fire alarm system within the City of Kerrville. These guidelines are not to be interpreted as containing all data required for proper design, installation, or approval.

All fire alarm systems for the purposes of these guidelines and any other guidelines or requirements of the Fire Marshal shall conform to the International Fire Code 2006, as adopted and amended by the City of Kerrville and NFPA 72 2010.

This guide does not replace, nor supersede any adopted codes and/or ordinances adopted by the City of Kerrville, or determinations and positions of the Fire Chief or Fire Marshal. This section is not meant to provide requirement for fire sprinkler monitoring systems, please refer to that section of guidance.

General Requirements

1. All alarm systems, new or replacement serving 20 or more alarm actuating devices shall be addressable fire detection systems.
2. Alarm systems serving more than 40 smoke detectors or more than 100 total alarm-activating devices shall be analog intelligent addressable fire detection systems.
3. Alarm systems shall be equipped with two (2) dedicated phone lines.
4. A manual fire alarm system shall be installed in Group A occupancies having an occupant load of 300 or more persons or more than 100 persons above or below the lowest level of exit discharge. Portions of Group E occupancies occupied for assembly purposes shall be provided with a fire alarm system as required for the Group E occupancy. (IFC 2006 Section 907.2.1)
5. A manual fire alarm system shall be installed in Group E educational occupancies. When automatic sprinkler systems or smoke detectors are installed, such systems or detectors shall be connected to the building fire alarm system. An approved smoke detection system shall be installed in Group E day care occupancies. Unless separated by a minimum of one hundred feet (100') open space, all buildings whether portable buildings or the main building, will be considered one building for alarm occupant load consideration and interconnection of alarm systems. (IFC 2006 Section 907.2.3)
6. High-rise buildings. Buildings having any floors used for human occupancy located more than 55 feet above the lowest level of fire department vehicle access shall be provided with an automatic fire alarm system and an emergency voice/alarm communications system in accordance with the International Fire Code 2006 Section 907.2.12.2.
7. Carbon Monoxide Detector required on first floor above a parking garage of multiple story residential building or structure.
8. Carbon Monoxide detectors required to be installed by a factory trained and certified installation contractor.
9. Addressable/analog intelligent systems shall contain a history file of the past 100 events.
10. Manual alarm actuating devices (pull stations) shall be an approved double action type.
11. All fire alarm systems shall be installed in such a manner that a failure of any single initiating device or single open in an initiating circuit conductor will not interfere with the normal operation of other such devices.
    a. All initiating circuit conductors shall be Class “A” wired with a minimum of six feet separation between supply and return circuit conductors
    b. IDC – Class “A” Style D
    c. SLC - Class “A” Style 6
    d. NAC - Class “B” Style Y
    e. The IDC from an addressable device used to monitor the status of a suppression system may be wired Class B, Style B provided the distance from the addressable device is within 10-feet of the suppression system device
12. Hard-wired systems shall be zoned by device type (e.g., water flow, smoke, heat, manual pull, or fixed extinguishing system) per floor with a maximum 22,500 square feet zone.

13. Duct detectors shall be provided with remote test reset devices with LED in an accessible location or have the ability to be reset from the fire alarm panel.
14. When the fire alarm control panel is not located at the main entrance, a remote annunciator shall be located at the entrance. Regardless of the location, the ability to control the fire alarm system shall be provided at the location of the automatic sprinkler system risers.
15. An exterior audible and visible notification device shall be provided on the exterior of the building where the sprinkler room is located at. The notification device shall operate on a water flow alarm only, shall be non-silenceable and shall continue to flash after the panel is silenced on the condition the alarm was a water flow alarm only. The notification device shall be wired from the fire alarm control panel as a dedicated latching circuit.
16. A mini-horn shall be placed in all bedrooms and living room of an apartment regardless of the number of units and the height or stories. This shall be tied into the water flow of the sprinkler system.
17. Approved supervised indicating control valves shall be provided at the point of connection to the riser on each floor in high-rise buildings.
18. Fire pumps shall be monitored for "loss of power", "phase reversal" and "pump running" conditions on distinct circuits. (IFC 2006 Section 913.4)
19. A UL Listed surge suppressor shall be provided for each FACP or Power Supply and shall be located a minimum of a 6 ft. wire run length from each protected device. It is recommended the surge suppressor is located as close as practical to the dedicated AC service.
20. Systems shall be resettable without any special knowledge or the use of an access code.
21. Any Energy Management system (EMS) panels utilized for life safety features shall be UL listed for life safety.
22. An adequate number of fire alarm notification devices shall be provided such that a minimum sound level 15 dbl above average ambient will be achieved.
23. All systems and circuits shall be supervised.
24. Primary power shall be from a dedicated circuit that is listed on the approved building electrical plans and properly labeled in the panel.
25. All fire alarm equipment shall be listed for its intended purpose.
26. The fire alarm control panel shall be listed, compatible with all devices, and capable of delivering all required signals.
27. A record of completion in accordance with NFPA 72 verifying that the system has been installed in accordance with the approved plans and specifications shall be provided.
28. Operating, testing and maintenance instructions and record drawings ("as-builts") and equipment specifications shall be provided at an approved location.

Mid Rise Residential Building

29. For residential structures, three or more stories in height, but not classified as a high-rise, see *Mid-Rise Building Construction Policy* for additional requirements.

Fire Department Connection Specifications

30. See *Fire Department Connection Guidelines* for requirements.

Fire Pumps

31. See *Fire Pumps Guidelines* for requirements.

Standpipes

32. See *Standpipe Guidelines* for requirements.

Monitoring

33. See *Monitoring of Fire Alarm/Fire Sprinkler Systems* Section for requirements.

Elevators

34. See *Elevator Recall and Shunt Trip Guidelines* for additional requirements.

Submittal Requirements

35. A minimum of two (2) sets of plans and minimum of one (1) set of plans and specifications/cut sheets shall be submitted in PDF Format. The second set of plans shall be submitted on paper. Plans shall contain sufficient detail to enable the plan reviewer to accomplish a complete review.
36. Each submittal shall have a:
    a. Kerrville Fire Marshal Fire Protection System Permit for Fire Alarm System
    b. A copy of State of Texas Fire Alarm APS license is required for the designing contractor
    c. A copy of liability insurance with the City of Kerrville listed as the "Certificate Holder".
    d. If System is designed by a PE: A State of Texas Engineers stamp is required on all pages
    e. A copy of State of Texas Fire Alarm ACR license is required for the installing company
37. Plans shall be clear and legible and all sheets shall be to scale.
38. The following information shall be provided on the plans:
    a. "Wet" APS or PE signature and stamp
    b. A title block that contains the following:
        1. Location of the installation
        2. Name and complete address of the business
        3. Name and complete address of the installing company
        4. Licensing information
        5. Date
        6. Drawn by
        7. Building permit number
        8. Authority Having Jurisdiction as the City of Kerrville
        9. Designed in accordance with the International Fire Code 2006, and NFPA 72, 2007
    c. A legend that contains the following:
        1. All devices shown on plans
        2. Total number of devices of each type
        3. Symbol, device description, manufacturer, model number, and quantity for each device
    d. North arrow
    e. Floor plan. Ceiling tiles shall not be shown on the drawings
    f. Device location
    g. Device address numbers provided for addressable/analog intelligent systems
    h. Site map inset
    i. Type of device
    j. Provide a "point-to-point" wiring configuration
    k. Fire alarm control panel
    l. Annunciators
    m. Square footage
    n. Location of doors
    o. Intended use of each room
    p. Location of all air-handling units
    q. Show location of all fire sprinkler risers, flow switches, tamper switches, and fire pumps (if equipped)
    r. Notification devices shall indicate candela rating
    s. Heat detectors shall indicate temperature rating
    t. Indicate the length of wiring between devices
    u. The notification device wiring shall be shown different from the initiating device wiring. When necessary, they shall be provided on different plan drawings
    v. The notes shall clearly indicate that the initiating circuit wiring shall be Class A
    w. Identification of the type of conduit used, if any
    x. Primary power to be a dedicated circuit
    y. The riser diagram shall include all devices as they are shown on the plans, or wired
39. Specification booklet shall contain the following:
    a. Scope of Work
    b. Data specifications sheets for all devices and equipment shall be provided
    c. Listing of the system design, operation, and rest functions
    d. Specific materials in the specification booklet are to be identified by an arrow or highlighter
    e. Battery discharge curves

f. Wire specifications. Identification on the gauge and type of wire used
g. Sequence of Operations in matrix format
h. Equipment List
i. Contact ID/Address table
j. Type of primary power and secondary power (i.e. size and number of batteries to be provided)
k. Device mounting height diagrams
l. Voltage drop calculations clearly indicating each notification device and wire length
m. Battery calculations including Standby and Alarm

Additional Information

40. ***Plans approved by the City of Kerrville, Fire Marshal give authorization for construction and/or operation. Final approvals are subject to field verification. Any approval issued by the Fire Marshal does not release the contractor or property owner from the responsibility of full compliance with all applicable codes and ordinances relating to the construction project.***
41. ***Installation, fabrication, or otherwise construction of the system is prohibited without approved plans and permit.***
42. ***All installations and/or operations must concur with the approved plans. Any deviation from the approved plans requires a re-submittal to the Fire Marshal.***
43. ***All fire department inspection forms and permits shall be kept in a permit packet on the job site until final inspection.***

Inspection Requirements

44. *Rough Wiring/ above ceiling:* All fire alarm wiring will be inspected for proper installation and penetration of any firewalls. *Fire alarm wiring shall not be tied to ceiling grid wire.*
45. *Audible Device Test*: Ensure audible notification devices provide occupant notification for all areas without strobe devices.
46. *Visual Device Test*: Ensure that all areas that do not have audible notification have visual coverage.
47. *Initiating Device Test*: Test all smoke detectors and/or fire alarm initiating devices for Alarm and/or Standby conditions.
48. *Water flow*: The water flow alarm will be tested by opening the inspectors test connection. The time delay feature on the flow switch switches must be set to a minimum delay of 90 seconds or less.
49. *Central Station Monitoring*: Alarms and/or trouble signals are required to be monitored by a UL listed Central Station. Standard response to contact the Fire Department shall be within 90 seconds.
50. *Device Address Test*: All analog or addressable system will have all devices pulled and/or activated. The print out must comply with the devices that were pulled.
51. *Final*: Final inspection.

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Section 4
Monitoring of Fire Alarm/Fire Sprinkler System

These guidelines are to be followed when a business, facility, or organization proposes to install or modify a fire sprinkler/fire alarm monitoring system within the City of Kerrville. These guidelines are not to be interpreted as containing all data required for proper design, installation, or approval.

All monitoring system for the purposes of these guidelines and any other guidelines or requirements of the Fire Marshal shall conform to the International Fire Code 2006, as adopted and amended by the City of Kerrville, NFPA 13 2010 and NFPA 72 2010 where applicable.

This guide does not replace, nor supersede any adopted codes and/or ordinances adopted by the City of Kerrville, or determinations and positions of the Fire Chief or Fire Marshal.

General Requirements

1. All valves controlling the water supply for automatic sprinkler systems, pumps, tanks, water levels and temperatures, critical air pressures, and water-flow switches except for fire department hose connection valves on all sprinkler systems shall be electronically supervised.
2. Backflow devices located in exterior vaults with locking vault lids are allowed to be chained in the open position with lock keys placed in the Knox Box, otherwise electronic supervisions is required.
3. Sprinkler and standpipe system water-flow detectors shall be provided for each floor tap to the sprinkler system and shall cause an alarm upon detection of water flow for more than 90 seconds.
4. Dry systems and manual dry standpipe systems shall be supervised with a minimum of 10 psig and a maximum of 40-psig air pressure with a high/low alarm.
5. Alarm, supervisory and trouble signals shall be distinctly different and shall be automatically transmitted to an approved central station, remote supervising station or proprietary supervising station as defined in NFPA 72.
6. An approved, audible/visual device shall be connected to every automatic sprinkler monitoring system shall be provided in the interior of the building being served.
7. For buildings with multiple tenants, one audible/visible device shall be provided in each tenant space.
8. An audible and visible notification device shall be provided on the exterior of the building located at where the sprinkler room is at. The notification device shall operate on a water flow alarm only and shall be non-silenceable (continue to flash after the panel is silenced). The notification device shall be wired from the fire alarm control panel as a latching circuit.
9. The alarm device required on the exterior of the building shall be a weatherproof horn/strobe notification appliance with a minimum 75-candela strobe rating, installed as close as practicable to the sprinkler riser room.
10. An approved manual device shall be located near fire sprinkler riser.
11. Water flow alarms shall be programmed non-silenceable.
12. The time delay feature on the water flow switches must be set to a delay of 30-90 seconds.
13. The notification device is not permitted to be wired from the water flow switch, powered from 120 VAC, or provided on an unsupervised circuit.
14. Duct detectors shall alarm supervisory only.
15. Supervisory signals shall be transmitted to the monitoring company.
16. Fire pumps shall be monitored for “loss of power”, “phase reversal,” and “pump running” conditions on distinct circuits.
17. All fire alarm equipment shall be listed for its intended purpose.
18. **Conventional or zone fire alarm control panels shall not be permitted.** ***Exception.*** Conventional or zone fire alarm control panels shall be permitted if they function in the capacity of a slave panel in a data loop, with each device on a separate zone provided with monitor modules monitored by the main addressable fire alarm control panel with all devices addressed with

device designation and location available at the main fire alarm control panel. Conventional or zone fire alarm control panels, utilized in the capacity above, shall also be capable of performing the operational requirements, as listed below, for the exterior horn/strobe, if monitoring a sprinkler system

19. The fire alarm control panel shall be listed, compatible with all devices, and capable of delivering all required signals.
20. All alarm systems, new or replacement serving 20 or more alarm actuating devices shall be addressable systems.
21. Alarm systems serving more than 40 smoke detectors or more than 100 total alarm-activating devices shall be analog intelligent addressable fire detection systems.
22. All fire alarm systems shall be installed in such a manner that a failure of any single initiating device or single open in an initiating circuit conductor will not interfere with the normal operation of other such devices.
    a. All initiating circuit conductors shall be Class "A" wired with a minimum of six feet separation between supply and return circuit conductors
    b. IDC – Class "A" Style D
    c. SLC - Class "A" Style 6
    d. NAC - Class "B" Style Y
    e. The IDC from an addressable device used to monitor the status of a suppression system may be wired Class B, Style B provided the distance from the addressable device is within 10-feet of the suppression system device
23. Systems shall be resettable without any special knowledge or the use of an access code.
24. The notification devices shall be wired from the fire alarm control panel as a dedicated latching circuit.
25. The notification device is not permitted to be wired from the water flow switch, powered from 120 VAC, operated by a control relay or provided on an unsupervised circuit.
26. All alarms are required to be transmitted to the approved supervising station monitoring company with the device(s) designation and location, or addressable device identification. This commonly is referred to as addressable. (i.e., a water flow device must be listed as water flow (multiple sprinkler risers shall be differentiated), smoke detector must be listed as a smoke detector third floor room 116, pull station as pull station main lobby) Alarms shall not be permitted to be transmitted as a "General Alarm" or "Zone" condition. This information must be in turn, transmitted to the Kerrville 911 Dispatch Center, with correct designation. This is commonly referred to as CONTACT ID.

Submittal Requirements

27. A minimum of two (2) sets of plans and minimum of one (1) set of plans and specifications/cut sheets shall be submitted in PDF Format. The second set of plans shall be submitted on paper. Plans shall contain sufficient detail to enable the plan reviewer to accomplish a complete review.
28. Each submittal shall have a:
    a. Kerrville Fire Marshal Fire Protection System Permit for Fire Alarm System
    b. A copy of State of Texas Fire Alarm APS license is required for the designing contractor
    c. A copy of liability insurance with the City of Kerrville listed as the "Certificate Holder".
    d. If System is designed by a PE: A State of Texas Engineers stamp is required on all pages
    e. A copy of State of Texas Fire Alarm ACR license is required for the installing company
29. The following information shall be provided on the plans:
    a. "Wet" APS or PE signature and stamp
    b. A title block that contains the following:
        1. Location of the installation
        2. Name and complete address of the business
        3. Name and complete address of the installing company
        4. Licensing information
        5. Date
        6. Drawn by
        7. Building permit number
        8. Authority Having Jurisdiction as the City of Kerrville
        9. Designed in accordance with the International Fire Code 2006, and NFPA 72, 2007
    c. A legend that contains the following:

1. All devices shown on plans
2. Total number of devices of each type
3. Symbol, device description, manufacturer, model number, and quantity for each device

d. North arrow
e. Floor plan. Ceiling tiles shall not be shown on the drawings
f. Device location
g. Device address numbers provided for addressable/analog intelligent systems
h. Site map inset
i. Type of device
j. Provide a "point-to-point" wiring configuration
k. Fire alarm control panel
l. Annunciators
m. Show location of all fire sprinkler risers, flow switches, tamper switches, and fire pumps (if equipped)
n. Notification devices shall indicate candela rating
o. Heat detectors shall indicate temperature rating
p. The notification device wiring shall be shown different from the initiating device wiring. When necessary, they shall be provided on different plan drawings
q. The notes shall clearly indicate that the initiating circuit wiring shall be Class A
r. Identification of the type of conduit used, if any
s. Primary power to be a dedicated circuit
t. The riser diagram shall include all devices as they are shown on the plans, or wired

30. Specification booklet shall contain the following:
    a. Scope of Work
    b. Data specifications sheets for all devices and equipment shall be provided
    c. Listing of the system design, operation, and rest functions
    d. Specific materials in the specification booklet are to be identified by an arrow or highlighter
    e. Battery discharge curves
    f. Wire specifications. Identification on the gauge and type of wire used
    g. Sequence of Operations in matrix format
    h. Equipment List
    i. Contact ID/Address table
    j. Type of primary power and secondary power (i.e. size and number of batteries to be provided)
    k. Device mounting height diagrams
    l. Voltage drop calculations clearly indicating each notification device and wire length
    m. Battery calculations including Standby and Alarm
31. Each submittal shall indicate:
    a. Pull Station near risers
    b. Detector above panel
    c. Location of notification devices
    d. Identification of phone lines service to building and dialer
    e. Dialer specs
    f. Service type (central station, remote, or proprietary)
32. Radio Transmitter Type Systems shall:
    a. Be Type 4 "Two-way Radio Frequency (RF) Multiplex Systems
    b. Identify method of testing in accordance with NFPA 72
    c. Identify the redundant path and location of each receiver (must hit 2 separate towers)
    d. Provide test report showing signal strength from two separate towers

Additional Information

33. ***Plans approved by the City of Kerrville, Fire Marshal give authorization for construction and/or operation. Final approvals are subject to field verification. Any approval issued by the Fire Marshal does not release the contractor or property owner from the responsibility of full compliance with all applicable codes and ordinances relating to the construction project.***
34. ***Installation, fabrication, or otherwise construction of the system is prohibited without approved plans and permit.***

35. ***All installations and/or operations must concur with the approved plans. Any deviation from the approved plans requires a re-submittal to the Fire Marshal.***
36. ***All fire marshal inspection forms and permits shall be kept in a permit packet on the job site until final inspection.***

Section 4
Fire Alarm Systems
Tenant Finish-Out/Building Alteration

These guidelines are to be followed when a business, facility, or organization proposes to modify an automatic fire alarm system or fire sprinkler monitoring system with fewer than 10 devices within the City of Kerrville. Modifications affecting or adding 10 or more device will require compliance with the New Fire Alarm System requirements. These guidelines are not to be interpreted as containing all data required for proper design, installation, or approval.

All fire alarm and fire sprinkler monitoring systems for the purposes of these guidelines and any other guidelines or requirements of the Fire Marshal shall conform to the International Fire Code 2006, as adopted and amended by the City of Kerrville and NFPA 72 2010.

This guide does not replace, nor supersede any adopted codes and/or ordinances adopted by the City of Kerrville, or determinations and positions of the Fire Chief or Fire Marshal.

General Requirements
Please see the Fire Alarm System and/or Fire Sprinkler Monitoring System Plan Submittal Requirements for additional information.

Submittal Requirements
1. A minimum of two (2) sets of plans and minimum of one (1) set of plans and specifications/cut sheets shall be submitted in PDF Format. The second set of plans shall be submitted on paper. Plans shall contain sufficient detail to enable the plan reviewer to accomplish a complete review.
2. Voltage drop and battery calculations will be required if the area(s) to be modified proposed to create a higher hazard classification or as determined by the Fire Marshal.
3. Each submittal shall have a:
    a. Kerrville Fire Marshal Fire Protection System Permit for Fire Alarm System
    b. A copy of State of Texas Fire Alarm APS license is required for the designing contractor
    c. A copy of liability insurance with the City of Kerrville listed as the “Certificate Holder”.
    d. If System is designed by a PE: A State of Texas Engineers stamp is required on all pages
    e. A copy of State of Texas Fire Alarm ACR license is required for the installing company
4. Plans shall be clear and legible and all sheets shall be in a common and appropriate scale.
5. The following information shall be provided on the plans:
    a. “Wet” APS or PE signature and stamp
    b. A title block that contains the following:
        1. Location of the installation
        2. Name and complete address of the business
        3. Name and complete address of the installing company
        4. Licensing information
        5. Date
        6. Drawn by
        7. Building permit number
        8. Authority Having Jurisdiction as the City of Kerrville
        9. Designed in accordance with the International Fire Code 2006, and NFPA 72, 2007
    c. A legend that contains the following:
        1. All devices shown on plans
        2. Total number of devices of each type
        3. Symbol, device description, manufacturer, model number, and quantity for each device
    d. North arrow
    e. Floor plan. Ceiling tiles shall not be shown on the drawings
    f. Device location
    g. Device address numbers provided for addressable/analog intelligent systems
    h. Type of device

i. Provide a “point-to-point” wiring configuration
j. Fire alarm control panel
k. Annunciators
l. Intended use of each room
m. Location of all air-handling units
n. Show location of all fire sprinkler risers, flow switches, tamper switches, and fire pumps (if equipped)
o. Notification devices shall indicate candela rating
p. Heat detectors shall indicate temperature rating
q. Indicate the length of wiring between devices
r. The notes shall clearly indicate that the initiating circuit wiring shall be Class A
s. Identification of the type of conduit used, if any

6. Specification booklet shall contain the following:
   a. Scope of Work
   b. Data specifications sheets for all devices and equipment shall be provided
   c. Specific materials in the specification booklet are to be identified by an arrow or highlighter
   d. Device mounting height diagrams

Additional Information

7. ***Plans approved by the City of Kerrville, Fire Marshal give authorization for construction and/or operation. Final approvals are subject to field verification. Any approval issued by the Fire Marshal does not release the contractor or property owner from the responsibility of full compliance with all applicable codes and ordinances relating to the construction project.***
8. ***Installation, fabrication, or otherwise construction of the system is prohibited without approved plans and permit.***
9. ***All installations and/or operations must concur with the approved plans. Any deviation from the approved plans requires a re-submittal to the Fire Marshal.***
10. ***All fire marshal inspection forms and permits shall be kept in a permit packet on the job site until final inspection.***

Section 4
Elevator Recall and Shunt Trip Guidelines

These guidelines are to be followed when a building, or facility, within the City of Kerrville, is provided with an elevator.

All elevators for the purposes of these guidelines and any other guidelines or requirements of the Fire Marshal shall conform to the International Fire Code 2006, as adopted and amended by the City of Kerrville.

This guide does not replace, nor supersede any adopted codes and/or ordinances adopted by the City of Kerrville, or determinations and positions of the Fire Chief or Fire Marshal.

General Requirements

1. Fire sprinklers **shall not** be installed in top of elevator shafts.
2. Detectors **shall not** be located in the top of elevator shafts.
3. Elevator recall shall be from smoke detector activation in the elevator lobby, or machine room.
4. Detectors in elevator lobby and machine rooms shall be smoke in conditioned spaces and heat in unconditioned spaces.
5. Where the rooms are unconditioned, heat detectors shall be provided (135° to 165°).
6. Shunt tripping shall be initiated **(only)** from the elevator machine room. The shunt shall be tripped by the activation of a 165° to 200° heat detector located within 2 feet of each fire sprinkler. Sprinklers shall have an ordinary/intermediate temperature (212° to 286°) operating range.
7. If hydraulic elevators are used and sprinklers are required in the bottom of the pit, a 135-165 heat detectors shall be required within 2' of each sprinkler.
8. Elevator car recall and fire fighter control shall be in accordance with Chapters 4, and 30 of the International Building Code 2006.
9. The Fire Marshal shall be notified and must witness acceptance testing of all elevators requiring fire department recall or elevator shunt.
10. Elevator cars shall be provided with a 2-way communication system. The communication system must be connected either to a constantly attended *(24-hour*) location or to a listed monitoring station.

Section 4
Commercial Kitchen Fire Suppression Systems

These guidelines are to be followed when a business, facility, or organization proposes to perform cooking operations that will involve grease-laden vapors or smoke, within the City of Kerrville.

These guidelines identify protection for cooking surfaces, which include deep fat fryers, griddles, upright broilers, char broilers, range tops, and grills, open face ovens, salamanders, cheese melters, woks, open face pizza ovens, and other similar equipment. The plenum space within the hood, above the filters, and exhaust ducts servicing the hood shall also be protected.

All commercial cooking operations for the purposes of these guidelines and any other guidelines or requirements of the Fire Marshal shall conform to the International Fire Code 2006, as adopted and amended by the City of Kerrville, NFPA 17A 2009 and NFPA 96 2008.

This guide does not replace, nor supersede any adopted codes and/or ordinances adopted by the City of Kerrville, or determinations and positions of the Fire Chief or Fire Marshal.

General Requirements

1. The piping shall be rigidly supported to prevent excessive movement and shall be protected from mechanical or other damage.
2. All systems shall meet UL 300.
3. Both a manual and automatic means of activation shall be provided.
4. A minimum of one manual activation pull station per system shall be provided in the path of egress, and shall be located no more the 48-inches not less than 42-inches above the floor.
5. The manual actuation device shall be located a minimum of 10-feet and a maximum of 20-feet from the kitchen exhaust system.
6. Where multiple manual actuators are installed for protection of separate extinguishing systems, they shall be clearly identified as to the hood being protected.
7. Distinctive audible and/or visual alarms shall be provided to indicate system operation and activation. Specifically, an audible/visual notification device shall be provided to indicate system operation, requiring personnel attention, and system recharge.
8. The fire suppression system shall be interconnected to the building fire alarm system. Activation of the Kitchen Hood Fire Suppression System shall cause the fire alarm to activate throughout the building.
9. Activation of the fire suppression system shall automatically shut-off the fuel supply, all electricity (lighting under the hood and to appliances), ventilation controls if required, fans, and any other equipment necessary. Shut-off valves and switches shall be of the types that require a manual action to reset.
10. When a building fire alarm system is provided, notification of the activation of the fire suppression system shall transmit Contact ID and conform to the *Fire Alarm Monitoring Guidelines*.

Fire Extinguisher Requirements

11. A fire extinguisher shall be installed within 30 feet of commercial food heat-processing equipment, as measured along an unobstructed path of travel.
12. Fire extinguishers provided for the protection of cooking appliances that use combustible cooking media (vegetable or animal oils and fats) shall be listed and labeled for Class K fires.
13. Class K fire extinguishers manufactured after January 1, 2002, shall not be equipped with “extended wand–type” discharge devices.
14. A placard shall be conspicuously placed near the extinguisher that states that the fire protection system shall be activated prior to using the fire extinguisher.
15. Existing dry chemical extinguishers without a Class K listing that were installed for the protection of Class K hazards shall be replaced with an extinguisher having a Class K listing when the dry chemical extinguishers become due for either a 6-year maintenance or hydrostatic test.

Submittal Requirements

16. A minimum of two (2) sets of plans and minimum of one (1) set of plans and specifications/cut sheets shall be submitted in PDF Format. The second set of plans shall be submitted on paper. Plans shall contain sufficient detail to enable the plan reviewer to accomplish a complete review.
17. Each submittal shall have a:
    a. Kerrville Fire Marshal Fire Protection System Permit for Wet/Dry Chemical Systems
    b. A copy of the applicable State of Texas Fire Extinguisher license is required for the designing contractor, Type PL, A, or K.
    c. A copy of State of Texas Fire Extinguisher ECR license is required for the installing company
    d. A copy of company's liability insurance with the City of Kerrville listed as the "Certificate Holder".
18. The following information shall be provided on the plans:
    a. The title block shall contain the following:
        1. Location of the installation
        2. Name and complete address of the business
        3. Name and complete address of the installing company
        4. Licensing information
    b. Indicate compliance with UL 300, NFPA 17 and NFPA 96
    c. Scale or suitable dimensions
    d. Hood dimensions
    e. Duct perimeter
    f. Piping schematic
    g. A floor plan shall be provided and shall indicate the location of the kitchen hood itself, electrical panel, manual pull station, K Class fire extinguisher and suppression system cabinet
    h. A minimum of one drawing shall be provided in 3D/Isometric view of the hood, ductwork and protected appliances
    i. Nozzle type, number, and location
    j. Location and temperature of the fusible links
    k. Interconnection to the building fire alarm system
    l. Interconnection to the fuel supply shut-off and indicate the type of fuel supply
19. A minimum of one (1) set of specifications shall be provided that include the following:
    a. Scope of Work
    b. Indication that only equipment that is referenced in the manufacturer's listed installation and maintenance manual or alternate suppliers' components that are listed for use with the specific extinguishing system shall be used
    c. Identification of special auxiliary devices acceptable to the system manufacturer
    d. List of the specific acceptance tests that are required
    e. Identification of the hazard to be protected and including such information as physical dimensions, cooking appliances, energy sources for each appliance, and air-handling equipment
    f. Equipment List
    g. Equipment specification sheets

Additional Information

20. Plans approved by the City of Kerrville, Fire Marshal give authorization for construction and/or operation. Final approvals are subject to field verification. Any approval issued by the Fire Marshal does not release the contractor or property owner from the responsibility of full compliance with all applicable codes and ordinances relating to the construction project.
21. Installation, fabrication or otherwise construction of the system is prohibited without approved plans and permit.
22. All installations and/or operations must concur with the approved plans. Any deviation from the approved plans requires a re-submittal to the Fire Marshal.
23. All fire marshal inspection forms and permits shall be kept in a permit packet on the job site until final inspection.

Inspection Requirements

24. Before calling to set up an acceptance test, a pre-test must be completed before calling

25. Acceptance test must be scheduled at least forty eight (48) hours prior to the test.
26. Air Test: Check nozzle operation by air blow-out test An extra cartridge bottle (CO2 or Nitrogen) will be required on systems with this type firing.CO2 blow test allowed on Power-Chem Systems. Blow tests are subject to Fire Marshal's approval. Observe activation of system through fuse link cutting.
27. Fuse link is required to be a dated link. Dated links must be changed every year
28. Utility Shut-off Test: All utilities connected to the protected cooking devices, shall have automatic shut-off valves.
29. Gas shut off valve visible and accessible**.** Make up air shut off and exhaust stayed on upon activation
30. Hood, duct and ventilation installed properly**.** Hood, duct and ventilation clean**.** Hood system must be cleaned every six (6) months**.** Filters must be cleaned at least once a month, it is recommended once every week**.** Fire suppression mechanisms must be clean
31. Manual Pull Station Test: Operation of the manual pull station shall bring about full system operation. Manual pull in path of exit
32. Class K extinguisher and sign within 30 feet of system
33. Audible/Visual Notification: Audible and/or visual notification devices shall be tested.
34. Fire Alarm Connection: Automatic fire-extinguishing systems shall be monitored by the building fire alarm system in accordance with NFPA 72.
35. Final: Final inspection. System was reset and tagged properly
36. Provide a certificate of inspection on the fire suppression system

Section 5
Additional Permits Index

This section facilitates application for permit, plan review, and inspections. Included are the most frequently found code problems, plans submittal requirements, policies for plan review and permitting and required inspections.

Plans shall only be submitted to the Kerrville Fire Marshal. All submittals require the completion of a Plan Review Submittal Application. Plans will not be accepted without a completed application. **No Exceptions.** Note: When using a courier or mail service, please ensure that a completed application is attached in order to expedite the plan review process.

- **Bonfire**
- **Model rocketry**
- **Pyrotechnics Displays**
- **Temporary Storage and Dispensing of Flammable and Combustible Liquids**
- **Aboveground Storage Tanks**
- **Aboveground Storage Tanks-Flammable Liquids**
- **Aboveground Storage Tanks-Class IIIB Liquids**
- **Underground Storage Tanks (Non-Liquid Propane Gas Tanks)**
- **Underground Storage Tanks-Liquid Propane Gas**
- **Tent-Membrane Structures**
- **Hazardous Materials**
- **High-Pile/High-Racked Storage**
- **Access Control/Delayed Egress Door Systems**
- **Access Control Gates**
- **Outdoor Burning**

Section 5
Bonfires/Recreational Fires

These guidelines are to be followed when a person, group, or organization proposes to perform an organized bonfire or recreational fire, within the City of Kerrville.

All bonfire operations for the purposes of these guidelines and any other guidelines or requirements of the Fire Marshal, shall conform to the International Fire Code 2006, as adopted and amended by the City of Kerrville and Texas Commission on Environmental Quality requirements.

This guide does not replace, nor supersede any adopted codes and/or ordinances adopted by the City of Kerrville, or determinations and positions of the Fire Chief or Fire Marshal.

General Requirements

1. Burning shall be commenced and conducted only when wind direction and other meteorological conditions are such that smoke and other pollutants will not cause adverse effects to any public road, landing strip, navigable water, or off-site structure containing sensitive receptor(s).
2. The location for bonfires shall not be less than 300-feet from any structure, and provisions shall be made to prevent the fire from spreading to within 300-feet of any structure or adjacent properties unless prior written approval is obtained from the adjacent occupant with possessory control.
3. The location for recreational fires shall not be less than 150-feet from any structure, and provisions shall be made to prevent the fire from spreading to within 150-feet of any structure or adjacent properties unless prior written approval is obtained from the adjacent occupant with possessory control.
4. Burning shall be conducted in compliance with the following meteorological and timing considerations:
    a. Burning shall not be commenced when surface wind speed is predicted to be less than six miles per hour (mph) (five knots) or greater than 23 mph (20 knots) during the burn period.
    b. Burning shall not be conducted during periods of actual or predicted persistent low-level atmospheric temperature inversions.
5. Electrical insulation, treated lumber, plastics, non-wood construction/demolition materials, heavy oils, asphaltic materials, potentially explosive materials, chemical wastes, and items containing natural or synthetic rubber must not be burned.
6. Bonfires or recreational fires shall be constantly attended until the fire is extinguished. A minimum of one portable fire extinguisher with a minimum 4-A rating or other approved on-site fire-extinguishing equipment, such as dirt, sand, water barrel, garden hose or water truck, shall be available for immediate utilization, or as otherwise required by the Fire Department.

Submittal Requirements

7. A detailed site plan must be submitted by the sponsoring organization, and shall include at the minimum the following.
    a. A site plan/drawing of the proposed burn site area, to include vehicle parking, buildings, obstructions, and roadways.
    b. Designate the burn site
    c. List of materials to be burned
8. Each submittal shall have a completed Kerrville Fire Marshal Burn Permit application.

Additional Information

9. Plans approved by the City of Kerrville, Fire Marshal give authorization for operation. Final approvals are subject to field verification. Any approval issued by the Fire Marshal does not release the operators from the responsibility of full compliance with all applicable codes and ordinances relating to the bonfire or recreational fire.

10. All installations and/or operations must concur with the approved plans. Any deviation from the approved plans requires a re-submittal to the Fire Marshal.
11. All fire marshal inspection forms and permits shall be kept in a permit packet on the site until completion of event.

Section 5
Model Rocketry

These guidelines are to be followed when a person, group, or organization proposes to perform an organized model rocketry launch, within the City of Kerrville.

All model rocketry operations, for the purposes of these guidelines and any other guidelines or requirements of the Fire Marshal, shall conform to the International Fire Code 2006, as adopted and amended by the City of Kerrville, NFPA 1122, NFPA 1125, NFPA 1127, City of Kerrville Standards, and FAA Title 14 CFR 101.1 to 101.25.

This guide does not replace, nor supersede any adopted codes and/or ordinances adopted by the City of Kerrville, or determinations and positions of the Fire Chief or Fire Marshal.

General Requirements

1. No model rocket user or rocketry club shall launch any model rockets without a valid permit from the Kerrville Fire Marshal's Office
2. A Range and Ignition Safety Officer (RSO) must be designated.
3. The launch site shall be located outdoors in a clear area, free from tall trees, buildings, power or utility lines, or dry combustibles.
4. Model rocket motors shall not exceed a total power limit/impulse of 320 Newton-seconds (72 pound-seconds).

Model Rocketry Safety Requirements

5. The following safety requirements shall be met:
    a. Model rockets shall be launched from a stable launch platform or device adequate enough to provide a safe flight path
    b. The launch platform shall have a blast deflector to prevent the motor exhaust from impinging upon the ground directly. Area around the launch platform shall be cleared or any loose or dry combustibles
    c. Launching system shall be remotely or electronically controlled
    d. All persons shall be a minimum of 30 feet from the launching platform at time of launch
    e. An audible 5 second countdown is required
    f. Launches shall be discontinued in winds in excess of 20 mph
    g. Launches shall occur only during daylight hours
    h. Launch angles shall be within 30 degrees of vertical
    i. All safety requirements of 14 CFR 101.1 to 101.25, and the National Association of Rocketry (NAR)
6. The permit holder shall be responsible for the safety of all spectators or other persons connected with launching of model rockets.
7. The Fire Marshal may suspend or revoke the Model Rocket Permit at any time and/or when the safety guidelines of the permit are not met, or conditions are unfavorable.

Launch Requirements

8. RSO will check participants parts (non-metallic), recovery (parachute), power limits (<320 N-sec, 72 lb-sec).
9. RSO will also check the Launch Site for cleanliness, size, stable launch platform (provides rigid guidance until it reaches speed), and fire extinguishers.
10. Appropriate safety equipment shall be provided to all launch site personnel.

Submittal Requirements

11. A detailed launch plan must be submitted by the sponsoring organization, and shall include at the minimum the following.
    a. Identify the RSO

b. A site plan/drawing of the proposed launch site area, to include vehicle parking, buildings, obstructions, launch site, launch platform, and roadways
c. Method for the disposal of any Hazardous Waste

12. Each submittal shall have a completed Kerrville Fire Marshal Model Rocketry Permit Application.

Additional Requirements

13. Plans approved by the City of Kerrville, Fire Marshal give authorization for operation. Final approvals are subject to field verification. Any approval issued by the Fire Marshal does not release the launch personnel from the responsibility of full compliance with all applicable codes and ordinances relating to the model rocket launch.
14. All installations and/or operations must concur with the approved plans. Any deviation from the approved plans requires a re-submittal to the Fire Marshal.
15. All fire marshal inspection forms and permits shall be kept in a permit packet on the site until completion of event.

Section 5
Pyrotechnics Display

These guidelines are to be followed when a business, group, or other entity within the City of Kerrville, requests the use and display of pyrotechnics, commonly referred to as "fireworks."

All pyrotechnic storage, use, and/or display criteria for the purposes of these guidelines and any other guidelines or requirements of the Fire Marshal shall conform to the International Fire Code 2006, as adopted and amended by the City of Kerrville, Texas State Fire Marshal's Office, ATF, and NFPA.

This guide does not replace, nor supersede any adopted codes and/or ordinances adopted by the City of Kerrville, or determinations and positions of the Fire Chief or Fire Marshal.

Territorial applicability.

1. This article shall be applicable and in force throughout the territory of the city within its corporate limits.
2. **Defined by Ordinance.** Fireworks shall mean any form of explosive or incendiary device designed to be set off or lighted by flame or heat, and shall specifically include, but not be limited to, Roman candles, skyrockets, sparklers, firecrackers, salutes, whistles, fuses, flares, flares, torches, bottle rockets, skyrockets, or any other type casing containing any propellant charge or pyrotechnic effect.
3. **Defined by International Fire Code.** Fireworks shall mean any composition or device for the purpose of producing a visible or an audible effect for entertainment purposes by combustion, deflagration, and detonation, and/or activated by ignition with a match or other heat-producing device that meets the definition of 1.4G fireworks or 1.3G fireworks as set forth herein.

Fees

4. <u>All pyrotechnic shows are required to be supervised by a representative of the Kerrville Fire Marshal's Office. In addition, a brush truck and two (2) firefighters are required to be on standby during and after the event. The permit holder is responsible for the Standby Personnel fee of $65 per hour, minimum of two hours for two personnel ($65 X 2 (Hours) X 2 (Personnel)). This fee is in addition to the permit fee and shall be payable to the City of Kerrville.</u>

General Requirements

5. It shall be unlawful for any individual, firm, partnership, corporation, or association to sell, possess, manufacture, storage, handle, transport, and use any fireworks. **Exception:** The use of fireworks for approved display as permitted by the fire marshal
6. Before the performance of any production, the operator shall submit a plan for the use of pyrotechnics to the Kerrville Fire Marshal.
7. The addition of pyrotechnics to a performance or any change in the presentation of pyrotechnics, excluding the reduction in the number or size of the devices, shall require approval by the Kerrville Fire Marshal.
8. For displays, compliance is required with the following:
   a. 2006 IFC
   b. Texas Occupational Code Chapter 2154, Regulation of Fireworks & Fireworks Displays & 28 TAC 34.800 for licensing
   c. NFPA 1123, 1124, 1126, and/or 160
   d. ATF Federal Explosive Law and Regulations and DOT regulations
9. All assistants shall be at least 18 years old.
10. All plans shall be submitted as soon as is possible so that the Kerrville Fire Marshal has time to be present and to notify other interested parties.
11. Based upon the location and size of the pyrotechnic display, a Fire Watch may be required throughout the duration of the display. This shall be determined at the sole discretion of the Fire Marshal.

12. No pyrotechnic displays shall be performed after 10:30 pm.
13. No outdoor pyrotechnic displays shall be permitted with wind velocities exceeding 20 MPH.

Submittal Requirements-Public Display

14. Each submittal shall have a
    a. Completed Kerrville Fire Marshal Permit Application
    b. A copy of your Texas State Fire Marshal's Office Pyrotechnics license.
    c. A copy of your ATF fireworks license.
    d. A copy of Texas State Drivers License with H/X Endorsement of individual who will be transporting Aerial Fireworks.
    e. Proof of Insurance including general liability, auto liability, worker's comp, and additional insured listed as the City of Kerrville, and all limits indicated.
15. Provide a copy of your Texas State Fire Marshal's Office Pyrotechnic permit indicating the following:
    a. Quantity of each type of pyrotechnics device (i.e. mortar, flash-bank, aerial, etc.)
    b. Total amount of 1.4G and/or 1.3G fireworks
    c. The name, address, email address, and phone number of the individual, group, or organization sponsoring the outdoor fireworks display
    d. The name, address, email address, and phone number of the supplier of the fireworks, if different from that of the operator
    e. The date and time of day at which the outdoor fireworks display is to be held, with a proposed rain/wind date and time in the event the display is postponed
    f. The exact location planned for the outdoor fireworks display
16. In addition, the following information shall be provided:
    a. Location and type of storage magazine and location and type of fireworks kept on site.
    b. Number of assistants who are to be present
    c. Means of site security
    d. The manner and place of storage of such fireworks prior to delivery to the outdoor fireworks display site.
17. Provide a diagram of the grounds on which the outdoor fireworks display is to be held showing the following:
    a. Point at which the fireworks are to be discharged
    b. Location of all buildings, highways, and other public rights of ways
    c. Location of other possible overhead obstructions
    d. Identify significant ground features
    e. Parking areas
    f. Spectator viewing areas
    g. Location of fireworks storage areas
    h. Fallout area, including dimensions
    i. North arrow
    j. Likely wind direction
    k. Location of significant roadways, including access and control points
    l. Traffic plans indicating the flow of vehicles into and out of the site before and after the display
    m. Location of emergency vehicle staging area and access routes

Pre-Show Review Inspection Requirements

18. Fireworks storage location and magazine
19. Mortar boxes
20. Separation distance between the audience and the pyrotechnic devices
21. Licenses and trained personnel on-site
22. Barricades, if required

Submittal Requirements-Proximate Audience Displays

23. This section shall apply to any outdoor use of pyrotechnics at distances less than those required by NFPA 1123, *Code for Fireworks Display*.
24. Each submittal shall have a
    a. Completed Kerrville Fire Marshal Permit Application

b. A copy of your Texas State Fire Marshal's Office Special Effect or Flame Effects license, which ever is applicable.
c. Proof of Insurance including general liability, auto liability, worker's comp, and all limits indicated.

25. The plan shall include the following:
    a. Name of the person, group, or organization sponsoring the production
    b. Date and time of day of the production
    c. Exact location of the production
    d. Name of the person actually in charge of firing the pyrotechnics (i.e., the pyrotechnic operator)
    e. Number, names, and ages of all assistants who are to be present
    f. Number and types of pyrotechnic devices and materials to be used, the operator's experience with those devices and effects, and a definition of the general responsibilities of assistants
    g. Diagram of the grounds or facilities where the production is to be held that shows the point at which the pyrotechnic devices are to be fired, the fallout radius for each pyrotechnic device used in the performance, and the lines behind which the audience is to be restrained
    h. Point of on-site assembly of pyrotechnic devices
    i. Manner and place of storage of the pyrotechnic materials and devices
    j. Material safety data sheet (MSDS) for the pyrotechnic material(s) to be used
    k. Certification that the set, scenery, and rigging materials are inherently flame- retardant or have been treated to achieve flame-retardancy
    l. Certification that all materials worn by performers in the fallout area during use of pyrotechnic effects shall be inherently flame-retardant or have been treated to achieve flame-retardancy
26. Indicate compliance with SB 693 for use of Flame Effects or Pyrotechnics.
27. Indicate compliance with Texas Occupational Code Chapter 2154 & TAC 34.800.

Pre-Show Review and Demonstration

28. A walk-through and a representative demonstration of the pyrotechnics shall be approved by the Kerrville Fire Marshal before a permit is approved.
29. The Kerrville Fire Marshal shall be permitted to waive this requirement based on past history, prior knowledge, and other factors, provided the authority is confident that the discharge of pyrotechnics can be conducted safely.
30. The demonstration shall be scheduled with sufficient time allowed to reset/reload the pyrotechnics before the arrival of the audience.
31. The pre-show inspections shall include a review of the following:
    a. In-place fire protection
    b. Fireworks storage location and magazine
    c. Detonation device
    d. Separation distance between the audience and the pyrotechnic devices
    e. Exits
    f. Licenses and trained personnel on-site
    g. Barricades, if required
32. Where the use of certain indoor pyrotechnics requires smoke detectors to be bypassed or air-handling systems to be disengaged, the fire marshal shall have a fire marshal representative shall be present for the demonstration.
33. The individual responsible for the life safety systems of the building shall return those systems to normal operating conditions as soon as the likelihood of false alarms from the pyrotechnics has passed.

Additional Information

34. Plans approved by the City of Kerrville, Fire Marshal give authorization for construction and/or operation. Final approvals are subject to field verification. Any approval issued by the Fire Marshal does not release the contractor or property owner from the responsibility of full compliance with all applicable codes and ordinances relating to the construction project.

35. All displays and/or operations must concur with the approved plans. Any deviation from the approved plans requires a re-submittal to the Fire Marshal's Office.
36. All fire marshal inspection forms and permits shall be kept in a permit packet on the job site until final inspection

Section 5
Temporary Storage and Dispensing of Flammable and Combustible Liquids

These guidelines are to be followed for all temporary storage and dispensing of Class I and II liquids for private use at construction sites, earth-moving projects, and gravel pits or borrow pits within the City of Kerrville.

All temporary aboveground storage tank requirements for the purposes of these guidelines and any other guidelines or requirements of the Fire Marshal shall conform to the International Fire Code 2006, as adopted and amended by the City of Kerrville.

This guide does not replace, nor supersede any adopted codes and/or ordinances adopted by the City of Kerrville, or determinations and positions of the Fire Chief or Fire Marshal.

Aboveground Storage Tank Requirements

1. The storage of Class I and II liquids in above-ground tanks is prohibited within all residential districts and the Downtown (DT Zoning District) unless otherwise approved by the Fire Marshal.
2. Storage areas shall be kept free from weeds and extraneous combustible material.
3. Open flames and smoking are prohibited in flammable or combustible liquid storage areas.
4. Tanks and containers for the storage of liquids above ground shall be conspicuously marked with the name of the product, which they contain, and the words: FLAMMABLE—KEEP FIRE AND FLAME AWAY. Tanks shall bear the additional marking: KEEP 50 FEET FROM BUILDINGS.
5. Metal containers used for storage of Class I or II liquids shall be in accordance with DOT's requirements or shall be of an approved design.
6. Discharge devices shall be of a type that does not develop an internal pressure on the container. Pumping devices or approved self-closing faucets used for dispensing liquids shall not leak and shall be well maintained. Individual containers shall not be interconnected and shall be kept closed when not in use.
7. The capacity of temporary aboveground tanks containing Class I or II liquids shall not exceed 500 gallons. Tanks shall be of the single-compartment design.
8. Fill openings shall be equipped with a locking closure device. Fill openings shall be separate from vent openings.
9. Tanks shall be provided with a method of normal and emergency venting. Emergency vents shall be arranged to discharge in a manner, which prevents localized overheating or flame impingement on any part of the tank in the event that vapors from such vents are ignited.
10. Tanks containing Class I or II liquids shall be kept outside and at least 50 feet (15 240 mm) from buildings and combustible storage. Additional distance shall be provided when necessary to ensure that vehicles, equipment and containers being filled directly from such tanks will not be less than 50 feet (15 240 mm) from structures, haystacks or other combustible storage.
11. Tanks shall be provided with top openings only or shall be elevated for gravity discharge.
12. Tanks with top openings shall be mounted as follows:
    a. On well-constructed metal legs connected to shoes or runners designed so that the tank is stabilized and the entire tank and its supports can be moved as a unit. or
    b. For stationary tanks, on a stable base of timbers or blocks approximately 6 inches (152 mm) in height which prevents the tank from contacting the ground.
    c. Tanks with top openings only shall be equipped with a tightly and permanently attached, approved pumping device having an approved hose of sufficient length for filling vehicles, equipment or containers to be served from the tank. Either the pump or the hose shall be equipped with a padlock to its hanger to prevent tampering. An effective anti-siphoning device shall be included in the pump discharge unless a self-closing nozzle is provided. Siphons or internal pressure discharge devices shall not be used.
13. Tanks with a connection in the bottom or the end for gravity-dispensing liquids shall be mounted and equipped as follows:

a. Supports to elevate the tank for gravity discharge shall be designed to carry all required loads and provide stability.
b. Bottom or end openings for gravity discharge shall be equipped with a valve located adjacent to the tank shell, which will close automatically in the event of fire through the operation of an effective heat-activated releasing device. Where this valve cannot be operated manually, it shall be supplemented by a second, manually operated valve.
c. The gravity discharge outlet shall be provided with an approved hose equipped with a self-closing valve at the discharge end of a type that can be padlocked to its hanger.

14. The area surrounding a tank or group of tanks shall be provided with drainage control or shall be diked to prevent accidental discharge of liquid from endangering adjacent tanks, adjoining property or reaching waterways.
    a. Drainage control and diking is not required for listed secondary containment tanks.

Dispensing from tank vehicles

15. Where approved, liquids used as fuels are allowed to be transferred from tank vehicles into the tanks of motor vehicles or special equipment, provided:
    a. The tank vehicle's specific function is that of supplying fuel to motor vehicle fuel tanks.
    b. The dispensing hose does not exceed 100 feet (30 480 mm) in length.
    c. The dispensing nozzle is an approved type.
    d. The dispensing hose is properly placed on an approved reel or in a compartment provided before the tank vehicle is moved.
    e. Signs prohibiting smoking or open flames within 25 feet (7620 mm) of the vehicle or the point of refueling are prominently posted on the tank vehicle.
    f. Electrical devices and wiring in areas where fuel dispensing is conducted are in accordance with the National Electrical Code.
    g. Tank vehicle-dispensing equipment is operated only by designated personnel who are trained to handle and dispense motor fuels.
    h. Provisions are made for controlling and mitigating unauthorized discharges.
16. Dispensing from tank vehicles shall be conducted at least 50 feet (15 240 mm) from structures or combustible storage.

Submittal Requirements

17. Each submittal shall have a completed Kerrville Fire Marshal Permit Application

Additional Information

18. Plans approved by the City of Kerrville, Fire Marshal give authorization for construction. Final approvals are subject to field verification. Any approval issued by the Fire Marshal does not release the contractor or property owner from the responsibility of full compliance with all applicable codes and ordinances relating to the construction project.
19. No above ground storage tank(s) or associated equipment may be installed, located, or otherwise manipulated on the site until a complete plan submittal is reviewed and accepted, and a AST Permit is issued for the location
20. All installations must concur with the approved plans. Any deviation from the approved plans requires a re submittal to the Fire Marshal's Office.
21. All fire marshal inspection forms and permits shall be kept in a permit packet on the job site until final inspection.

Inspections Requirements

22. Site visit shall be conducted to ensure the following items:
    a. Storage areas free from weeds and extraneous combustible material.
    b. Open flames and smoking are prohibited in flammable or combustible liquid storage areas.
    c. Tanks and containers conspicuously marked with the name of the product which they contain and the words:
        i. FLAMMABLE—KEEP FIRE AND FLAME AWAY.
        ii. KEEP 50 FEET FROM BUILDINGS.
    d. Fill openings shall be equipped with a locking closure device.
    e. Fill openings separate from vent openings.
    f. Tanks kept outside and at least 50 feet from buildings and combustible storage.

g. Drainage control or diking to prevent accidental discharge of liquid from endangering adjacent tanks, adjoining property or reaching waterways.
h. Drainage control and diking is not required for listed secondary containment tanks.

Section 5
Aboveground Storage Tanks

These guidelines are to be followed when a permanent aboveground storage tank is moved, installed, or otherwise added, within the City of Kerrville.

All aboveground storage tank requirements for the purposes of these guidelines and any other guidelines or requirements of the Fire Marshal shall conform to the International Fire Code 2006, as adopted and amended by the City of Kerrville.

This guide does not replace, nor supersede any adopted codes and/or ordinances adopted by the City of Kerrville, or determinations and positions of the Fire Chief or Fire Marshal.

Where Prohibited

1. Locations where above-ground tanks are prohibited. Storage of Class I and II liquids in above-ground tanks outside of buildings is prohibited in all residential districts and the Downtown (DT Zoning District) district.

Required foam fire protection systems

2. Foam fire protection shall be provided for above-ground tanks over 500 gallons and is in accordance with one of the following:
   a. Used for the storage of Class I or II liquids.
   b. Used for the storage of crude oil.
   c. Used for in-process products and is located within 100 feet (30 480 mm) of a fired still, heater, related fractioning or processing apparatus or similar device at a processing plant or petroleum refinery as herein defined.
   d. Considered by the fire code official as posing an unusual exposure hazard because of topographical conditions, nature of occupancy, proximity on the same or adjoining property, and height and character of liquids to be stored, degree of private fire protection to be provided. and facilities of the fire department to cope with flammable liquid fires. **Exception:** U.L. listed 2085/2080 tanks below 1,000 gallon capacity will not require foam fire protection.

Tanks

3. No above ground storage tank(s) or associated equipment may be installed, located, or otherwise manipulated on the site until a complete plan submittal is reviewed and accepted, and a permit is issued for the location
4. Tank shall be listed or designed in accordance with recognized engineering practices, IFC and NFPA.
5. Tanks constructed with integral secondary containment shall be UL 142 listed.
6. Exterior protected above-ground storage tank shall have secondary containment drainage control or diking,
7. Each tank shall have a permanent nameplate identifying its design standard.

Tank Venting

8. The use of a flame arrester or venting device in a vent line shall comply with their listing also compliant with API 2028 for a flame arrestor.
9. Tank's normal vent shall not be less than 12 ft. above adjacent grade nor located to trapped vapors under eaves, and at least 5 ft. from building openings, or property lines.
10. Vent outlets on atmospheric tanks storing Class IIIB liquids are allowed to discharge inside a building if the vent is a normally closed vent.
11. Tank vent piping shall not be manifolded unless required for special purposes such as vapor recovery, vapor conservation or air pollution control.
12. For shop-fabricated tanks, the emergency vent that is commercial has a stamp indicating opening pressure and flow rate.
13. Tank emergency vent does not vent inside a building.

Openings Other Than Vents

14. Filling, emptying, and vapor recovery openings shall be located outside the building, not less than 5 ft. from building openings or lot lines.
15. For top load tanks, a metallic fill pipe shall be installed to minimize static electricity by terminating within 6 inches of the tank bottom.
16. Tank openings shall be on the top only.
17. A spill container with a capacity of not less than 5 gallons shall be provided for each fill connection. Top fill containers are noncombustible, fixed to the tank and equipped with a manual drain valve that drains into the main tank.

Overfill Requirements

18. A tank storing Class I, II, IIIA liquids outside a structure shall be equipped with a device or means to prevent overflow.
19. Outside tanks with a volume of more than 1,320 gallons that contain Class I, II, or IIIA liquids shall have an approved overfill prevention system.
20. Tanks storing Class I, II, and IIIA liquids inside a building shall be equipped with a device to prevent overflow into the building and are not limited to a float valve, a preset meter in fill line, or a valve actuated by the weight of the tank's content.

Piping

21. Connections to tank that are below the liquid level shall be provided with an internal or external control valve near the tank shell.
22. Tank piping shall be supported and protected from mechanical damage or fire exposure.
23. Pipe joints shall be liquid tight, welded, threaded or flanged. Class 1 liquid joints are welded if the joints are located inside the building.
24. Pipe testing criteria shall be detailed on the plans, hydrostatic tested to 150 percent of the system design pressure or pneumatically tested to 110 percent of the system design pressure for a minimum of 10 minutes with no leakage.
25. Piping shall be labeled in accordance with ANSI A13-1
26. Fill pipe connection shall be designed to provide a direct connection to the vehicle's fuel delivery hose so fuel is not exposed to the air during filling.

Valves

27. Piping shall have sufficient number of control valves and check valves to control the flow of liquids.
28. Any portion of the fill pipe below the top of the tank, a check valve shall be installed at the fill pipe not more than 12 in. from the fill hose connection.

Tank Support

29. Tank foundation, support, and anchorages are designed in accordance with NFPA 30:4.2.4 and the IBC, IFC 2006 Section 3404.2.9.2.
30. Tanks containing Class I, II, IIIA liquids that are elevated more than 12 inches above grade shall have a fire-resistance rating of not less than 2-hours in accordance with ASTM E 1529.

Miscellaneous

31. Plans show location and verbiage for signs prohibiting open flames and no smoking.
32. Tanks exceeding 100 gallons have NFPA 704 placard location and content detailed on the plans.
33. Tank and piping subject to vehicular damage is protected by guard posts designed in accordance with IFC 2006.
34. Drainage control and diking are provided along with containment capacity calculations unless technical report is provided stating no hazard exists, or the tank is a listed tank with secondary containment.

Submittal Requirements

35. A minimum of two (2) sets of plans and minimum of one (1) set of plans and specifications/cut sheets shall be submitted in PDF Format. The second set of plans shall be submitted on paper. Plans shall contain sufficient detail to enable the plan reviewer to accomplish a complete review.
36. Each submittal shall have a completed:

a. Kerrville Fire Marshal Permit Application
b. TCEQ Permit for tanks over 1,100 gallons
c. Copy of Contractors License for tanks over 1,100 gallons

37. Provide a written description of the operation of the tank.
38. The submittal package must include documentation identifying compliance with all above requirements.
39. Site plan drawings of the installation location and layout, to include:
    a. Primary and emergency power hookups (if provided)
    b. All buildings and structures
    c. Fire lanes and fire hydrants
    d. Location(s) of other dispensing locations (if remote) and other tanks (if provided)
40. A full equipment listing of all tanks, piping, valves, and other equipment.
41. Manufacturer documentation for all parts and materials used in the project, this is to include the pumps, relief valves, and tank.
42. Plan drawings shall show both plan view, section view, and other pertinent information.
43. Plan drawings shall be generated by the installing company, and shall not be copied and marked according to installation.
44. Provide documentation of tank testing and ability to hold a vacuum. This is in addition to any testing required by the Fire Marshal.

Additional Information

45. Plans approved by the City of Kerrville, Fire Marshal give authorization for construction. Final approvals are subject to field verification. Any approval issued by the Fire Marshal does not release the contractor or property owner from the responsibility of full compliance with all applicable codes and ordinances relating to the construction project.
46. All installations must concur with the approved plans. Any deviation from the approved plans requires a resubmittal to the Fire Marshal's Office.
47. All fire marshal inspection forms and permits shall be kept in a permit packet on the job site until final inspection.

Section 5
Aboveground Storage Tanks
Flammable Liquids

These guidelines are to be followed for all temporary storage and dispensing of Class I and II liquids for private use at construction sites, earth-moving projects, and gravel pits or borrow pits within the City of Kerrville.

All temporary aboveground storage tank requirements for the purposes of these guidelines and any other guidelines or requirements of the Fire Marshal shall conform to the International Fire Code 2006, as adopted and amended by the City of Kerrville and NFPA 30 2008.

This guide does not replace, nor supersede any adopted codes and/or ordinances adopted by the City of Kerrville, or determinations and positions of the Fire Chief or Fire Marshal.

Aboveground Storage Tank Requirements

1. Tanks must be installed by a licensed or approved aboveground storage tank installer.
2. Approved flame arrestors and venting devices shall be installed in the all vent lines. (IFC 2006, Section 3404.2.7.3.2).
3. The tank(s) shall be provided with secondary containment. All tanks must meet or exceed UL 142.
4. The tank(s) must meet, or exceed UL 2085 when subject to vehicular impact or pose a significant hazard based upon contents or location.
5. When the installation location may be subject to vehicular impact, bollards designed IAW IFC 2006 Section 312.
6. The tank must display the UL Listing placard.
7. A leak detection system must be installed, equipped with on-site audible and/or visual warning devices, as approved by IFC 2006 and NFPA 30.
8. A spill container having a capacity of not less than 5 gallons shall be provided at each fill connection.
9. An overfill prevention system shall be provided for each tank to prevent being filled in excess of 95% capacity. The system must meet the requirements of IFC 2006, Section 3404.2.9.6.6: 3404.2.9.6.6 During fill operation, the system shall:
    a. Provide an independent means of notifying the person filling that the fluid level has reached 90 percent of tank capacity by providing a tank level gauge marked at 90 percent of tank capacity, or other approved means.
    b. Automatically shut off the flow of fuel to the tank when the quantity reaches 95 percent of tank capacity.
    c. Reduce the flow rate to not more than 15 gallons per minute so that at the reduced flow rate, the tank will not overflow for 30 minutes, and automatically shut off flow into the tank so that none of the fittings on the top of the tank are exposed to product because of overfilling.
10. The tank fill connection shall be provided with a means for making a direct connection to the tank's vehicle fuel delivery hose so that no fuel is exposed to the open air during the filing operation.
11. Anti-siphon devices shall be installed in each pipe connected to the AST, where the piping extends below the level of the tank.
12. Emergency shut-offs shall be provided during filling and dispensing operations.
13. Relief valves shall be provided.
14. Pump dispensing devices shall be equipped with vapor-recovery connections.
15. Appropriate labeling and signs in accordance with IFC 2006, Section 3404.2.3, must be provided;
    a. A permanent sign shall be placed at the fill point for the tank, documenting the filling procedure and tank calibration chart.
    b. "Smoking or Open Flames Prohibited"
    c. An approved emergency procedures sign IAW IFC 2006 Section 2204.3.5
    d. A permanent sign indicating that when filling the tank, parking is prohibited in the fire lane.

e. A placard specifically identifying the material therein. The placard shall be IAW NFPA 704.

16. Dispensing locations shall limit fuel delivery to 25 gallons and require a manual action to resume, IAW IFC 2006 Section 2204.3.7.
17. Any additional requirements of NFPA 30 and/or IFC 2006 Chapter 34, must also be met

Submittal Requirements

18. The submittal package must include all above requirements and such requirements shall be identified in the submittal package.
19. Provide a written description of the operation of the tank.
20. Site plan drawings of the installation location and layout, to include; including
    a. Primary and emergency power hookups (if provided);
    b. All buildings and structures;
    c. Fire lanes and fire hydrants;
    d. Location(s) of other dispensing locations (if remote) and other tanks (if provided).
21. A full equipment listing of all tanks, piping, valves, and other equipment.
22. Manufacturer documentation for all parts and materials used in the project, this is to include the pumps, relief valves, and tank.
23. Plan drawings to include the above requirements shall be submitted for review and approval, **PRIOR** to installation.
24. Plan drawings shall show both plan view, section view, and other pertinent information.
25. Plan drawings shall be generated by the installing company, and shall not be copied and marked according to installation.
26. Provide documentation of tank testing and ability to hold a vacuum. This is in addition to any testing required by the Fire Department.
27. ***No aboveground storage tank(s) or associated equipment may be installed, located, or otherwise manipulated on the site until an AST Permit is issued for the location.***

General Submittal Requirements

28. Each submittal shall have a completed Kerrville Fire Marshal Plan Review/Permit Application.
29. Plans approved by the Fire Marshal's Office give authorization for construction. Final approvals are subject to field verification. Any approval issued by the Fire Marshal's Office does not release the contractor or property owner from the responsibility of full compliance with all applicable codes and ordinances relating to the construction project.
30. All installations must concur with the approved plans. Any deviation from the approved plans requires a re-submittal to the Fire Marshal's Office.
31. All fire marshal inspection forms and permits shall be kept in a permit packet on the job site until final inspection.

Section 5
Aboveground Storage Tanks
Class IIIB Liquids

These guidelines are to be followed when an aboveground storage tank is moved, installed, modified or otherwise installed within the City of Kerrville. This guide is to apply only to the installation, storage and/or use of Class IIIB Combustible Liquids, as defined by the International Fire Code 2006 Section 3402.

All aboveground storage tank requirements for the purposes of this guideline and any other guidelines or requirements of the Fire Marshal shall conform to the International Fire Code 2006, as adopted and amended by City of Kerrville and NFPA 30 2008, Flammable and Combustible Liquids Code.

This guide does not replace, nor supersede any codes and/or ordinances adopted by the City of Kerrville, or determinations and positions of the Fire Chief or Fire Marshal.

Aboveground Storage Tank Requirements

1. The tank(s) shall be provided with secondary containment.
2. The tank(s) shall meet, or exceed UL 142, and the provisions of NFPA 30.
3. Tank(s) shall be constructed of steel. Poly-tanks are not permitted.
4. When the installation location may be subject to vehicular impact, bollards designed IAW IFC 2006 Section 312, or a UL 2085 tank may be required, based upon a review of the hazards and protection provided.
5. The tank must display the UL Listing placard.
6. Normal and emergency venting shall be provided. Emergency venting shall include the calculations to determine the minimum vent sizing in CFH.
7. Approved flame arrestors, when required by API 2028, and venting devices shall be installed in the all vent lines.
8. A spill container having a capacity of not less than 5 gallons shall be provided at each fill connection.
9. Appropriate labeling and signs in accordance with IFC 2006, Section 3404.2.3, must be provided.
    a. “Smoking or Open Flames Prohibited”.
    b. Emergency procedures.
    c. NFPA 704 or equivalent placard specifically identifying the material therein.
10. All piping and piping systems shall be designed in accordance with NFPA 31 and IFC Chapter 34.

Submittal Requirements

11. Provide a written description of the operation to which the tank is to be installed.
12. Site plan drawings of the installation location and layout, to include; including.
    a. All buildings and structures.
    b. Fire lanes and fire hydrants.
    c. Location of tanks with regards to the above.
13. A full equipment listing of all tanks, piping, valves, and other equipment.
14. Manufacturer documentation for all parts and materials used in the project.
15. Drawings, to include the above requirements, shall be submitted for review and approval, **PRIOR** to installation.
16. Drawings shall be generated by the installing company specific to the installation, and shall not be copied and marked according to installation. Drawings shall show plan view and other pertinent information.
17. Provide manufacturer’s documentation of tank testing and ability to hold a vacuum. This is in addition to any additional testing required by the Fire Marshal.
18. No aboveground storage tank(s) or associated equipment may be installed, located, or otherwise manipulated on the site until an AST Permit is issued for the location.

General Submittal Requirements

19. Each submittal shall have a completed Kerrville Fire Marshal Plan Review/Permit Application.
20. Plans approved by the City of McKinney, Fire Marshal's Office give authorization for construction. Final approvals are subject to field verification. Any approval issued by the Fire Marshal's Office does not release the contractor or property owner from the responsibility of full compliance with all applicable codes, standards and ordinances relating to the construction project.
21. All installations must concur with the approved plans. Any deviation from the approved plans requires a re-submittal to the Fire Marshal's Office.
22. All installations and/or operations must concur with the approved plans. Any deviation from the approved plans requires a re-submittal to the Fire Marshal's Office.
23. All fire marshal inspection forms and permits shall be kept in a permit packet on the job site until final inspection.

Section 5
Underground Storage Tanks
Non-Liquid Propane Gas Tanks

These guidelines are to be followed when an underground storage tank is moved, installed, or otherwise added, within the City of Kerrville City Limits.

All underground storage tank requirements for the purposes of these guidelines and any other guidelines or requirements of the Kerrville Fire Marshal shall conform to the International Fire Code 2006, as adopted and amended by the City of Kerrville. Additional requirements will apply to Motor Fuel-Dispensing Facilities.

This guide does not replace, nor supersede any codes and/or ordinances adopted by the City of Kerrville, or determinations and positions of the Fire Chief or Fire Marshal.

General Requirements

1. The tank must be installed by a TECQ licensed underground storage tank installer.
2. No underground storage tank(s) or associated equipment may be installed, located, or otherwise manipulated on the site until a permit is issued for the location.
3. Approved flame arrestors and venting devices shall be installed in the vent lines. (IFC 2006 Section 3404.2.7.3.1)
4. An approved method of secondary containment shall be provided for underground tank and piping systems. Plans shall indicate method for compliance with this requirement such as secondary containment (double-wall) tanks and piping or vaults.
5. A leak detection system must be installed and provided with approved vapor and liquid detection, equipped with on-site audible and/or visual warning devices with battery backup, as approved by IFC 2006 and NFPA 30.
6. Leak detection. Underground storage tank systems shall be provided with an approved method of leak detection from any component of the system that is designed and installed in accordance with NFPA 30 and as specified by IFC 2006 Section 3404.2.11.5.3.
7. Dry Sumps. Approved sampling tubes of a minimum 6 inches in diameter shall be installed in the backfill material of each underground flammable or combustible liquid storage tank. The tubes shall extend from a point 12 inches below the average grade of the excavation to ground level and shall be provided with suitable surface access caps. Each tank site shall provide a sampling sump at the corners of the excavation with a minimum of 4 sumps. Sampling tubes shall be placed in the product line excavation within 10 feet of the tank excavation and one every 50 feet routed along the product lines towards the dispensers, a minimum of two are required.
8. The design, fabrication and construction of tanks shall comply with NFPA 30. Each tank shall bear a permanent nameplate or marking indicating the standard used as the basis of design.
9. The tank fill connection shall be provided with a means for making a direct connection to the tank's vehicle fuel delivery hose so that no fuel is exposed to the open air during the filing operation.
10. A permanent sign shall be placed at the fill point for the tank, documenting the filling procedure and tank calibration chart.
11. Emergency shut-offs shall be provided during filling and dispensing operations.
12. Relief valves, both emergency and normal, shall be provided and shall normally be in the closed position.
13. Thrust blocks, safety straps/deadman's or other suitable means of restraint must be installed at each change in direction of the pipe.
14. Underground tanks and their piping shall be protected by either of the following:
    a. A properly engineered, installed, and maintained cathodic protection system in accordance with recognized engineering standards of design.
    b. Approved or listed corrosion-resistant materials or systems

Tanks

15. Flammable and combustible liquid storage tanks located underground, either outside or under buildings, shall be in accordance with all of the following:
    a. Tanks shall be located with respect to existing foundations and supports such that the loads carried by the latter cannot be transmitted to the tank.
    b. The distance from any part of a tank storing liquids to the nearest wall of a basement, pit, cellar, or lot line shall not be less than 3 feet (914 mm).
    c. A minimum distance of 1 foot (305 mm), shell to shell, shall be maintained between underground tanks.
16. Excavation for underground storage tanks shall be made with due care to avoid undermining of foundations of existing structures. Underground tanks shall be set on firm foundations and surrounded with at least 12 inches of noncorrosive inert material, such as clean sand.
17. Underground tanks shall be covered with one of the following:
    a. At least 12 in. (300 mm) of backfill, covered with 12 in. (300 mm) of clean earth
    b. At least 12 in. (300 mm) of compacted backfill, on top of which a slab of reinforced concrete at least 4 in. (100 mm) thick is placed
18. Where the tanks are, or are likely to be, subjected to traffic, they shall be protected against damage from vehicles passing over them by one of the following:
    a. At least 36 in. (900 mm) of backfill
    b. At least 18 in. (450 mm) of compacted backfill of a type recommended by the tank manufacturer and at least 6 in. (150 mm) of reinforced concrete
    c. At least 18 in. (450 mm) of compacted backfill of a type recommended by the tank manufacturer and at least 8 in. (200 mm) of asphaltic concrete
19. When asphaltic or reinforced concrete paving is used as part of the protection, it shall extend at least 12 in. (300 mm) horizontally beyond the outline of the tank in all directions.
20. Thrust blocks, safety straps/deadman's or other suitable means of restraint must be installed for each underground storage tank.

Piping

21. Underground piping shall be installed on at least 6 in. (150 mm) of well-compacted bedding material.
22. In areas subject to vehicle traffic, the pipe trench shall be deep enough to permit a cover of at least 18 in. (450 mm) of well-compacted backfill material and pavement.
23. In paved areas where a minimum 2 in. (50 mm) of asphalt is used, backfill between the pipe and the asphalt shall be permitted to be reduced to 8 in. (200 mm) minimum.
24. In paved areas where a minimum 4 in. (100 mm) of reinforced concrete is used, backfill between the pipe and the asphalt shall be permitted to be reduced to 4 in. (100 mm) minimum.
25. In areas not subject to vehicle traffic, the pipe trench shall be deep enough to permit a cover of at least 6 in. (150 mm) of well-compacted backfill material.
26. Piping within the same trench shall be separated horizontally by at least two pipe diameters. Separation need not exceed 9 in. (230 mm).
27. Two or more levels of piping within the same trench shall be separated vertically by a minimum 6 in. (150 mm) of well-compacted bedding material.

Spill/Overfill Prevention

28. Fill pipes shall be equipped with a spill container.
29. An overfill prevention system shall be provided for each tank that operates as follows:
    a. Automatically shut off the flow of fuel to the tank when the quantity reaches 95 percent of tank capacity and
    b. Alert the transfer operator when the tank is no more than 90 percent full by restricting the flow of liquid into the tank or triggering the high-level alarm

Leak Prevention

30. Daily inventory records shall be maintained for underground storage tank systems.
31. Approved sampling tubes of a minimum 6 inches in diameter shall be installed in the backfill material of each underground flammable or combustible liquid storage tank. The tubes shall extend from a point 12 inches below the average grade of the excavation to ground level and shall be provided with suitable surface access caps. Each tank site shall provide a sampling

sump at the corners of the excavation with a minimum of four sumps. Sampling tubes shall be placed in the product line excavation within 10 feet of the tank excavation and one every 50 feet routed along the product lines towards the dispensers, a minimum of two are required.

Tank openings other than vents

32. Filling, emptying and vapor recovery connections to tanks containing Class I, II or IIIA liquids shall be located outside of buildings at a location free from sources of ignition and not less than 5 feet (1524 mm) away from building openings or lot lines of property that can be built on. Such openings shall be provided with a liquid-tight cap, which shall be closed when not in use, and properly identified.
33. For underground tanks, fill pipe and discharge lines shall enter only through the top. Fill lines shall be sloped toward the tank. Underground tanks for Class I liquids having a capacity greater than 1,000 gallons (3785 L) shall be equipped with a tight fill device for connecting the fill hose to the tank.

Vents

34. Relief valves, both emergency and normal, shall be provided and shall normally be in the closed position.
35. Vent pipes from underground tanks storing Class I liquids shall be located so that the discharge point is outside of buildings, higher than the fill pipe opening, and not less than 12 ft (3.6 m) above the adjacent ground level.
36. Vent pipe outlets shall be located and directed so that vapors will not accumulate or travel to an unsafe location, enter building openings, or be trapped under eaves and shall be at least 5 ft (1.5 m) from building openings and at least 15 ft (4.5 m) from powered ventilation air intake devices.
37. Vent pipes from tanks storing Class II or Class IIIA liquids shall terminate outside of the building and higher than the fill pipe opening.
38. Vent pipes shall not be obstructed by devices provided for vapor recovery or other purposes unless the tank and associated piping and equipment are otherwise protected to limit back-pressure development to less than the maximum working pressure of the tank and equipment by the provision of pressure-vacuum vents, rupture discs, or other tank-venting devices installed in the tank vent lines.
39. Vent outlets and devices shall be protected to minimize the possibility of blockage from weather, dirt, or insect nests.
40. Vent pipes shall be permitted to be fitted with return bends, coarse screens, or other devices to minimize ingress of foreign material.
41. Vent pipes and vapor return piping shall be installed without sags or traps in which liquid can collect.
42. Where tank vent piping is manifolded, pipe sizes shall be such as to discharge, within the pressure limitations of the system, the vapors they could be required to handle when manifolded tanks are filled simultaneously.
43. Piping systems shall be bonded and grounded in accordance with NFPA 30 6.5.4.
44. Each loading and unloading riser shall be marked to identify the product for which it is to be used.

Submittal Requirements

45. A minimum of two (2) sets of plans and minimum of one (1) set of plans and specifications/cut sheets shall be submitted in PDF Format. The second set of plans shall be submitted on paper. Plans shall contain sufficient detail to enable the plan reviewer to accomplish a complete review.
46. Each submittal shall have a completed:
    a. Kerrville Fire Marshal Permit Application.
    b. Texas Commission on Environmental Quality permit
    c. Copy of Contractors Texas Commission on Environmental Quality License.
47. Provide a written description of the operation and contents of the tank(s) and any associated piping and/or system(s).
48. The submittal package must include documentation identifying compliance with all above requirements.
49. A site plan drawing of the installation location and layout, to include:
    a. All buildings and structures

b. Fire lanes and fire hydrants
c. Location(s) of tanks, vent lines, underground product lines, leak detection, dry sumps, and dispensing locations

50. A full equipment listing of all tanks, piping, valves, and other equipment.
51. Manufacturer documentation for all parts and materials used in the project, this is to include the pumps, relief valves, and tank.
52. Plan drawings shall show the actual install layout, including all piping and pumps.
53. Plan drawings shall show both plan view, section view, and other pertinent information.
54. Plan drawings shall be generated by the installing company, and shall not be copied and marked according to installation.
55. Provide documentation of tank testing and ability to hold a vacuum. This is in addition to any testing required by the Fire Marshal.

Additional Information

56. Plans approved by the City of Kerrville, Fire Marshal give authorization for construction. Final approvals are subject to field verification. Any approval issued by the Fire Marshal does not release the contractor or property owner from the responsibility of full compliance with all applicable codes and ordinances relating to the construction project.
57. All installations must concur with the approved plans. Any deviation from the approved plans requires a resubmittal to the Fire Marshal's Office.
58. All fire marshal inspection forms and permits shall be kept in a permit packet on the job site until final inspection.

Section 5
Underground Storage Tanks
Liquid Propane Gas

These guidelines are to be followed when an underground storage tank - LPG is moved, installed, or otherwise added, within the City of Kerrville City Limits.

All underground storage tank – LPG requirements for the purposes of these guidelines and any other guidelines or requirements of the Kerrville Fire Marshal shall conform to the International Fire Code 2006, as adopted and amended by the City of Kerrville and NFPA 58 2008.

This guide does not replace, nor supersede any codes and/or ordinances adopted by the City of Kerrville, or determinations and positions of the Fire Chief or Fire Marshal.

General Requirements
All underground LP-Gas systems shall be designed and installed in accordance with the International Fire Code 2006, City Fire Code Amendments, provisions of NFPA 58: Standard for Storage and Handling of Liquefied Petroleum Gases, NFPA 54: National Fuel Gas Code, Texas Railroad Commissions Rules.

1. All underground LP-Gas storage tanks shall comply with ASME.
2. No person shall install or maintain any LP-Gas container or operate any tanked vehicle, which is used for the transportation of LP-Gas, without a permit. Permits shall be required as set forth in Section 105. When a single container or the aggregate of interconnected containers is over 2,000 gallons water capacity, the installer shall submit plans to the Fire Marshal. A permit shall not be required for the installation or maintenance of portable containers of less then 120 gallons water capacity as long as the same are used only in connection with a bona fide travel trailer which, at all times, is capable of being pulled or driven upon the streets or highways. Any mobile home, travel trailer, or trailer of any kind, which is located in one place and has had the wheels or tires removed, is not a bona fide travel trailer, to meet this exception. A permit shall not be granted in the event that natural gas is available as a fuel supply.
3. It shall be unlawful to use Propane, Butane, or other LP-Gas products in the City where natural gas is available. It shall be unlawful to install above-ground storage tanks, exceeding a capacity of 25 gallons, for Propane, Butane or other LP-Gas product in any zoning district allowed for residential uses, such as single-family, duplex, multifamily, or mobile homes. The maximum tank size shall be 1000 water gallons size container in a residential zone or in total aggregate of 1000 water gallons in a residential zone. In industry, the tank size shall be determined by the demand of quantity needed to operate appliances and equipment.
4. This permit will remain valid for permitted location until such time natural gas is made available at permitted site within 350'. Should liquid propane use be disconnected, another permit will be required before replacing with another liquid propane tank. Should a liquid propane tank and/or piping become unsafe and proper repairs are not made, permit may be revoked.
5. Liquid propane Distribution Company shall be responsible to make any and all repairs prior to off-loading any fuel into such damaged tank and will be responsible to notify the Kerrville Fire Marshal's office prior to making repairs.
6. Tank hood may not be disguised or covered prohibiting firefighters to recognize this hazard. Distributing company is responsible for forwarding this information to all parties involved with the existence of the permit.
7. Containers installed in areas with no vehicular traffic shall be installed at least 6 in. (15 cm) below grade.
8. In areas where vehicular traffic is expected, a non-interchangeable underground container shall be installed at least 18 in. (460 mm) below grade, or the container shall be protected from damage from vehicles.
9. Protection shall be provided for the fitting housing, housing cover, container connections, and piping against vehicular damage.

10. Approved interchangeable aboveground–underground container assemblies installed underground shall not be placed with the container shell more than 12 in. (0.30 m) below grade.
11. Containers shall be coated or protected to minimize corrosion.
12. Containers shall be set level and shall be surrounded by earth or sand firmly tamped in place.
13. Backfill shall be free of rocks and abrasives. **The backfill material used to cover the container should be compacted soil (Clean and free of abrasives) or coarse sand.** Backfill material containing crushed rock or other material that could damage the container coating shall be avoided.
14. Cathodic protection should be considered as an additional method to minimize corrosion. Anodes are used in this process and should be attached to the container according to the anode manufacturer's instructions. The number and size of anodes installed varies, depending on the container size.
15. Dielectric couplings should be used to isolate the container from the piping when using metallic piping (i.e., copper, steel, etc.) to minimize current flow.
16. A periodic test program should be established to monitor the effectiveness of the corrosion protection for the container. Inspection records should be made available to the container owner.
17. Prior to burial, the container may be inspected by the Kerrville Fire Marshal for any coating damage that may have been caused during the installation process. Back fill must be on site when tank installation is being inspected.
18. Prior to finishing back filling of the LP Tank, it will be required that the Kerrville Fire Marshal to inspect the back fill placed in the hole. Back fill to be six (6) to eight (8) inches from the grade level.
19. Depending on the construction of the driveway, the LP Tank may require vehicle protection for the underground LP Tank.

Submittal Requirements

20. A minimum of one (1) set of plans to scale. Plans shall contain sufficient detail to enable the plan reviewer to accomplish a complete review.
21. Kerrville Fire Marshal Permit Application
22. A site plan drawing of the installation location and layout, to include:
    a. All buildings and structures
    b. Fire lanes, access roads and fire hydrants
    c. Location(s) of tanks, vent lines, underground product lines, leak detection, dry sumps, and dispensing locations
23. The submittal package must include documentation identifying compliance with all above requirements.
24. Provide documentation of tank testing and ability to hold a vacuum. This is in addition to any testing required by the Fire Marshal.

Additional Information

25. Plans approved by the City of Kerrville, Fire Marshal give authorization for construction. Final approvals are subject to field verification. Any approval issued by the Fire Marshal does not release the contractor or property owner from the responsibility of full compliance with all applicable codes and ordinances relating to the construction project.
26. All installations must concur with the approved plans. Any deviation from the approved plans requires a resubmittal to the Fire Marshal's Office.
27. All fire marshal inspection forms and permits shall be kept in a permit packet on the job site until final inspection
28. Tank **MUST NOT** be covered prior to final inspection and/or approval of Fire Marshal.

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Section 5
Tent/Canopy/Membrane Structure

These guidelines are intended to provide the minimum submittal requirements for obtaining a Kerrville Fire Marshal Permit. Additional requirements and/or information may be required based upon the individual project.

All Tent and Membrane Structures for the purposes of these guidelines and any other guidelines or requirements of the Fire Marshal shall conform to the International Fire Code 2006, as adopted and amended by the City of Kerrville.

This guide does not replace, nor supersede any codes and/or ordinances adopted by the City of Kerrville, or determinations and positions of the Fire Chief or Fire Marshal.

General Requirement

1. No tank, canopy or associated equipment may be installed, located, or otherwise manipulated on the site until a permit is issued for the location.
2. A permit is required when the tent or membrane structure has an area in excess of 200 sq. ft. and canopies in excess of 400 sq. ft.
3. A minimum of 20 ft. clear width shall be provided around the tent/canopy, and not closer than 20 feet to lot lines, buildings, other temporary structures, vehicles. Support ropes and guy wires are not included. *Unless otherwise approved.*
4. The structure shall not be located within a fire lane or public street.
5. Fire apparatus access roads shall be provided.
6. Smoking, cooking or use of open flames in the tent shall not be permitted. If cooking is to be used, a separate dedicated tent operation may be allowed. Additional requirements shall apply.
7. Approved “No Smoking” signs shall be conspicuously posted.
8. Exits, with a minimum width of 6ft. each, shall be provided and kept clear at all times.
9. The number of exits shall be determined by the occupant load.
10. A minimum of a 12-foot “fire break” shall be provided around the exterior of the tent/canopy/membrane structure that is free of guy ropes or other obstructions. Or, as otherwise approved by the fire department.
11. Membrane structures, tents or canopies shall have a permanently affixed label bearing the identification of size and fabric or material type.
12. An affidavit or affirmation shall be submitted to the fire code official and a copy retained on the premises on which the tent or air-supported structure is located. The affidavit shall attest to the following information relative to the flame propagation performance criteria of the fabric:
    a. Names and address of the owners of the tent, canopy or air-supported structure.
    b. Date the fabric was last treated with flame-retardant solution.
    c. Trade name or kind of chemical used in treatment.
    d. Name of person or firm treating the material.
    e. Name of testing agency and test standard by which the fabric was tested.
13. Hay, straw, shavings, or similar combustible materials shall not be located within any tent or air-supported structure.
14. Open flame or other devices emitting flames, fire, or heat or any flammable or combustible liquids, gas, or charcoal shall be permitted under the tent/canopy or located within 20 ft., unless specifically approved and permitted.
15. Warming of foods and similar operations using solid flammables or other similar devices that do not pose a fire hazard, shall be permitted.
16. If heating and cooking devices are approved, they shall not be located within 10 ft. of an exit or combustible materials. These distances may be increased based upon the type and hazard of the cooking.
17. A minimum of one 2A-10BC fire extinguisher shall be provided for each tent less than 3,000 sq. ft. or less than 75 ft. across.
18. A minimum of 3 ft. clearance shall be provided from the inside material of the tent, canopy or membrane structure and the interior contents.

19. All applicable requirements of the International Fire Code 2006 Chapter 24, Tents and Membrane Structures shall be met.

Submittal Requirements

20. A minimum of two (2) sets of plans and minimum of one (1) set of plans and specifications/cut sheets shall be submitted in PDF Format. The second set of plans shall be submitted on paper. Plans shall contain sufficient detail to enable the plan reviewer to accomplish a complete review
21. Each submittal shall have a completed:
    a. Kerrville Fire Marshal Permit Application
    b. Certification of fire resistance rating providing date last treated and chemical used for treatment.
22. A detailed site and floor plan that indicated the following:
    a. Details of the means of egress
    b. Seating or occupancy capacity
    c. Exits and exit pathways
    d. Use of the tent/canopy/membrane structure
    e. Location of cooking or heating devices will be within or near the tent/canopy/membrane structure
    f. Locations of fire extinguishers
    g. Fire Department access route and nearest fire hydrants

Cooking Tents

23. Tents where cooking is performed shall be separated from other tents, canopies or membrane structures by a minimum of 20 ft.
24. Outdoor cooking that produces sparks or grease-laden vapors shall not be performed within 20 ft. of a tent, canopy or membrane structure.
25. LP-gas containers (Propane) shall not be located within the tent and shall be a minimum of 10 ft. from all tens, canopies or membrane structures.
26. Flammable or combustible liquids shall not be located within a tent, canopy or membrane structure, and shall be located a minimum of 50 ft. away
27. Cooking and heating equipment shall not be located within 10 ft. of any exits

Additional Information

28. Plans approved by the City of Kerrville, Fire Marshal give authorization for construction and/or operation. Final approvals are subject to field verification. Any approval issued by the Fire Marshal does not release the contractor or property owner from the responsibility of full compliance with all applicable codes and ordinances relating to the event.
29. Installation or otherwise construction of the tent/canopy/membrane structure is prohibited without approved plans and permit.
30. All installations and/or operations must concur with the approved plans. Any deviation from the approved plans requires a re-submittal to the Fire Marshal's Office.
31. All fire marshal inspection forms and permits shall be kept in a permit packet on the job site until final inspection.

Inspection Requirements

32. Verification of compliance and inspection by the Fire Marshal shall be required PRIOR to use.
33. The permit shall be valid only for the dates specifically requested and indicated on the issued permit.
34. All required exits shall be available and kept clear.
35. Fire extinguishers must be kept in place and operable.
36. Fire resistance label is displayed.
37. No combustibles or heating/ cooking devices within the tent, unless specifically requested and approved.
38. Additional inspections based upon the use and hazards.

Section 5
Hazardous Materials

These guidelines are intended to provide the minimum submittal requirements for obtaining a Hazardous Materials Permit. Additional requirements and/or information may be required based upon the individual project.

All hazardous materials storage, use, or handling for the purposes of these guidelines and any other guidelines or requirements of the Fire Marshal shall conform to the International Fire Code 2006, as adopted and amended by the City of Kerrville.

As a minimum, all applicable requirements of the International Fire Code 2006 Chapter 27 shall be met. Additional fire protection requirements may be included based upon a review of the proposed storage arrangement or chemicals to be used or stored (i.e. smoke exhaust, IR/UV detection, etc.)

This guide does not replace, nor supersede any codes and/or ordinances adopted by the City of Kerrville, or determinations and positions of the Fire Chief or Fire Marshal.

Approval and issuance of the Hazardous Materials Permit must be completed prior to the issuance of a Certificate of Occupancy.

General Requirements

1. The construction documents for a High-Pile/High-Racked Storage Permit may be concurrently submitted for review with the building plans, providing all of the below information is provided. All supporting documentation shall be identified and readily available or distinguishable.
2. The submittal shall be separate from any other plan submittal, but may refer to those submittals given they have been submitted to the Fire Marshal for review.
3. A permit is required when the quantity of hazardous materials to be used or stored exceeds those indicated in the International Fire Code 2006 Table 105.6.20, or when required by the Fire Marshal.

Submittal Requirements

4. A minimum of two (2) sets of plans and minimum of one (1) set of plans and specifications/cut sheets shall be submitted in PDF Format. The second set of plans shall be submitted on paper. Plans shall contain sufficient detail to enable the plan reviewer to accomplish a complete review.
5. A scaled copy of the Site Plan and Floor Plan which indicate the type and locations of the materials using the classifications in IFC 2006 Chapter 27.
6. Location of fire department access doors.
7. Type and location of all fire suppression, fire detection systems and smoke exhaust systems.
8. Location of valves controlling the water supply of ceiling and in-rack sprinklers.
9. Size and location of all water supplies and/or water lines servicing the building or site.
10. Documentation and/or policies/procedures indicating compliance with housekeeping and maintenance requirements.
11. Location of MSDS sheets for all hazardous materials stored or used on-site. Indicate whether the information is available in hardcopy on-site, internet, or telephone.
12. Each submittal shall have a completed Kerrville Fire Marshal Permit Application.
13. A P.E. seal is required on all construction/specification plans.
14. Each application for a permit shall include a Hazardous Materials Management Plan (HMMP). The HMMP shall include a facility site plan designating the following:
    a. Storage and use areas.
    b. Maximum amount of each material stored or used in each area.
    c. Range of container sizes.
    d. Locations of emergency isolation and mitigation valves and devices.

e. Product conveying piping containing liquids or gases, other than utility-owned fuel gas lines and low-pressure fuel gas lines.
f. On and off positions of valves for valves that are of the self-indicating type.
g. Storage plan showing the intended storage arrangement, including the location and dimensions of aisles.
h. The location and type of emergency equipment.
i. The plans shall be legible and drawn approximately to scale. Separate distribution systems are allowed to be shown on separate pages.

15. An application for a permit shall include a Hazardous Materials Inventory Statement (HMIS), such as SARA Title III, Tier II Report, or other approved statement. The HMIS shall include the following information:
    a. Manufacturer's name.
    b. Chemical name, trade names, hazardous ingredients.
    c. Hazard classification.
    d. MSDS or equivalent.
    e. United Nations (UN), North America (NA) or the Chemical Abstract Service (CAS) identification number.
    f. Maximum quantity stored or used on-site at one time.
    g. Storage conditions related to the storage type, temperature, and pressure.

Facility Storage Map

16. Site Plan. Provide a Site Plan showing the location of all building, structures, chemical loading areas, parking lots, internal roads/fire lanes, storm sewer inlets and adjacent property uses. A Utility Plan shall also be provided to indicate the location of all fire hydrants, the fire department connection (FDC) and the location of the fire sprinkler riser and/or fire pump.
17. Building Floor Plan. Provide a scaled and dimensions floor plan for each building where hazardous materials are stored and/or used. Mark each hazardous material storage/use location with a name, letter, or number code of your choice. Access to each storage area, the location of emergency equipment, secondary containment areas, purpose of other areas in the facility, and location of aboveground and underground tanks (sumps, pumps, vaults, etc.) shall also be indicated.
18. Chemical Breakdown Listing. Provide a detailed listing of each individual chemical, total quantity, individual container size, number of containers, container type and NFPA 704 rating.

Emergency Contact

19. Two emergency contact persons shall be designated. Representatives shall be available on a 24 hour basis.
20. Contact information for a representative hazardous materials tracking company shall be provided, if applicable.

Additional Information

21. Plans that are approved and permitted by the City of Kerrville, Fire Marshal give authorization for construction. Final approvals are subject to field verification. Any approval issued by the Fire Marshal does not release the contractor or property owner from full compliance with applicable codes and ordinances relating to the construction project.
22. All installations must concur with the approved plans, permit and plan review letter. Any deviation from the approved plans requires that plans be resubmitted to the Fire Marshal for permit.
23. Installation or otherwise stocking of hazardous materials is prohibited without approved plans and permit.
24. All fire Marshal inspection forms and permits shall be kept in a permit packet on the job site until final inspection.

Inspection Requirements

25. *Permit Posted*: Permit is clearly posted near the entrance to the occupancy.
26. *Permitted Quantity is not exceeded*: The quantities permitted are not exceeded.
27. *Controls in Place*: Administrative and/or containment controls are in place. Proper storage requirements are provided for the quantity of materials stored. Non-compatible materials shall be properly segregated.

28. *Placard:* Required NFPA 704 diamond placard posted.
29. *Date of Issue*: Permit is valid for one year from date of issue.

Section 5
High-Pile/High-Racked Storage

These guidelines are intended to provide the minimum submittal requirements for obtaining a Kerrville Fire Marshal Permit. Additional requirements and/or information may be required based upon the individual project.

All High-Pile/High-Racked combustible storage for the purposes of these guidelines and any other guidelines or requirements of the Fire Marshal shall conform to the International Fire Code 2006, as adopted and amended by the City of Kerrville.

This guide does not replace, nor supersede any codes and/or ordinances adopted by the City of Kerrville, or determinations and positions of the Fire Chief or Fire Marshal.

Approval and issuance of the High-Piled Storage Permit must be completed prior to the issuance of a Temporary Certification of Occupancy or "Permission to Stock".

"Permission to Stock" allows the contractor to bring in merchandise within the HPS area for the purposes of stocking only. In turn, this allows personnel other that construction staff inside the building, prior to issuance of a Certification of Occupancy. Permission to Stock can only be given provided all the fire protection systems (fire alarm, fire sprinkler, fire pump, smoke control, etc.) have been 100% approved, tested and inspection by the Kerrville Fire Marshal's Office, and the HPS Permit has been reviewed, approved and issued.

General Requirements

1. High-piled/High-Racked storage is the storage of combustible materials in closely packed piles or combustible materials on pallets, in racks or on shelves where the top of storage is greater than 12-feet in height.
2. High-piled combustible storage also includes certain high-hazard commodities, such as rubber tires, Group A plastics, flammable liquids, idle pallets and similar commodities, where the top of storage is greater than 6-feet in height.
3. Any building exceeding 5,000 square feet that has a clear height in excess of 12 feet, making it possible to be used for storage in excess of 12 feet, shall be considered to be high-piled storage and shall comply with the provisions of this section. When a specific product cannot be identified, a fire protection system shall be installed as for Class IV commodities, to the maximum pile height.
4. A rack storage plan is required prior to fire sprinkler plan approval.
5. The construction documents for a High-Pile/High-Racked Storage Permit may be concurrently submitted for review with the building plans, providing all of the below information is provided. All supporting documentation shall be identified and readily available or distinguishable.
6. The submittal shall be separate from any other plan submittal, but may refer to those submittals given they have at a minimum been submitted to the Fire Marshal for review.

Minimum Plan Requirements

7. A minimum of two (2) sets of plans and minimum of one (1) set of plans and specifications/cut sheets shall be submitted in PDF Format. The second set of plans shall be submitted on paper. Plans shall contain sufficient detail to enable the plan reviewer to accomplish a complete review.
8. Each submittal shall have a completed Kerrville Fire Marshal Permit Application.
9. A P.E. seal is required on all construction/specification plans.
10. Plan submittal package shall include the following:
    a. A scaled copy of the Site Plan.
    b. Floor plan of the building showing locations and dimensions of High-Pile/High-Racked storage areas, and any fixtures.
    c. Usable storage height for each storage area.
    d. Number of tiers within each rack, if applicable.

e. Commodity clearance between top of storage and the sprinkler deflector for each storage arrangement.
f. Aisle dimensions between each storage array.
g. Maximum pile volume for each storage array.
h. Construction and engineering drawings for the rack system.
i. Location and classification of commodities in accordance with IFC 2006 Section 2303.
j. Location of commodities, which are banded or encapsulated.
k. Location of required fire department access doors.
l. Type of fire suppression and fire detection systems.
m. Location of valves controlling the water supply of ceiling and in-rack sprinklers.
n. Type, location, and specifications of smoke removal and curtain board systems.
o. Dimensions and location of transverse and longitudinal flue spaces.
p. Additional information regarding required design features, commodities, storage and fire protection features within High-Pile/High-Racked storage area shall be provided at the time of permit, when required by the code official.
q. Size and location of all water supplies and/or water lines servicing the building or site.
r. Documentation and/or policies or procedures indicating compliance with all housekeeping and maintenance requirements.
s. Location and representative diagram of required signage.
t. Provide an evacuation plan for publicly accessible areas and a separate set of plans indicating location and width of aisles, location of exits, exit access doors, exit signs, height of storage, and location of hazardous materials.

Emergency Contact

11. Two emergency contact persons shall be designated. Representatives shall be available on a 24 hour basis.
12. Contact information for a representative hazardous materials tracking company shall be provided, if applicable.

Evacuation Plan *(IFC 2006 Section 2301.4)*

13. Provide an evacuation plan for publicly accessible areas and a separate set of plans indicating location and width of aisles, location of exits, exit access doors, exit signs, height of storage, and location of hazardous materials.

Additional Information

14. Plans that are approved and permitted by the City of Kerrville Fire Marshal's Office give authorization for construction. Final approvals are subject to field verification. Any approval issued by the Fire Marshal does not release the contractor or property owner from full compliance with applicable codes and ordinances relating to the construction project.
15. All installations must concur with the approved plans, permit and plan review letter. Any deviation from the approved plans requires that plans be resubmitted to the Fire Marshal's Office for permit.
16. Installation or otherwise stocking of hazardous materials is prohibited without approved plans and permit.
17. All fire marshal inspection forms and permits shall be kept in a permit packet on the job site until final inspection.

Inspection Requirements

18. *Permit Posted*: Permit is clearly posted near the entrance to the occupancy.
19. *Permitted Quantity is not exceeded*: The quantities permitted are not exceeded.
20. *Controls in Place*: Administrative and/or containment controls are in place. Proper storage requirements are provided for the quantity of materials stored. Non-compatible materials shall be properly segregated.
21. *Date of Issue*: Permit is valid for one year from date of issue.

Section 5
Access-Controlled/Delayed Egress Door Systems

These guidelines are to be followed when a building, or facility within the City of Kerrville, is provided with an approved, entry and exit access controlled or delayed egress door for pedestrian traffic.

All access control criteria for the purposes of these guidelines and any other guidelines or requirements of the Fire Marshal shall conform to the International Fire Code 2006, as adopted and amended by the City of Kerrville.

This guide does not replace, nor supersede any codes and/or ordinances adopted by the City of Kerrville, or determinations and positions of the Fire Chief or Fire Marshal.

Access-Controlled Egress Door
Operational Requirements
The entrance doors in a means of egress in buildings with an occupancy in Group A, B, E, M, R-1 or R-2 and entrance doors to tenant spaces in occupancies in Groups A, B, E, M, R-1 and R-2 are permitted to be equipped with an approved entrance and egress access control system which shall be installed in accordance with the following criteria:

1. A sensor shall be provided on the egress side arranged to detect an occupant approaching the doors. The doors shall be arranged to unlock by a signal from or loss of power to the sensor. The senor must be list for its intended use.
2. Loss of power to that part of the access control system, which locks the doors, shall automatically unlock the doors. This is to include both the access and egress side of the door.
3. The doors shall be arranged to unlock from a manual unlocking device located 40 inches to 48 inches (1016 mm to 1219 mm) vertically above the floor and within 5 feet (1524 mm) of the secured doors. Ready access shall be provided to the manual unlocking device and the device shall be clearly identified by a sign that reads “PUSH TO EXIT.” When operated, the manual unlocking device shall result in direct interruption of power to the lock—independent of the access control system electronics—and the doors shall remain unlocked for a minimum of 30 seconds.
4. If a full building smoke detection system is not provided, approved smoke detectors shall be provided on both the access and egress sides of doors and in a location approved by the authority having jurisdiction of NFPA 72.
5. Activation of the building fire alarm system, if provided, shall automatically unlock the doors, and the doors shall remain unlocked until the fire alarm system has been reset.
6. Activation of the building automatic sprinkler or fire detection system, if provided, shall automatically unlock the doors. The doors shall remain unlocked until the fire alarm system has been reset.
7. Entrance doors in buildings with occupancy Group A, B, E or M shall not be secured from the egress side during periods that the building is open to the public.
8. *Group E Occupancies Only:* In Group E Occupancies where ingress is available by keys located in a Knox Box mounted at the main entrance to the building, the Fire Alarm must unlock the egress portion or capability of all doors while the ingress function may remain locked.

Delayed Egress Locks
Operational Requirements
Approved, listed, delayed egress locks shall be permitted to be installed on doors serving any occupancy except Group A, E and H occupancies in buildings that are equipped throughout with an automatic sprinkler system in accordance with the International Fire Code 2006 Section 903.3.1.1 or an approved automatic smoke or heat detection system installed in accordance with the International Fire Code 2006 Section 907, provided that the doors unlock in accordance with Items listed below. A building occupant shall not be required to pass through more than one door equipped with a delayed egress lock before entering an exit.

9. The doors unlock upon actuation of the automatic sprinkler system or automatic fire detection system.
10. The doors unlock upon loss of power controlling the lock or lock mechanism.
11. The door locks shall have the capability of being unlocked by a signal from the fire command center.
12. The initiation of an irreversible process which will release the latch in not more than 15 seconds when a force of not more than 15 pounds (67 N) is applied for 1 second to the release device. Initiation of the irreversible process shall activate an audible signal in the vicinity of the door. Once the door lock has been released by the application of force to the releasing device, relocking shall be by manual means only.
    Exception: Where approved, a delay of not more than 30 seconds is permitted.
13. A sign shall be provided on the door located above and within 12 inches (305 mm) of the release device reading: PUSH UNTIL ALARM SOUNDS. DOOR CAN BE OPENED IN 15 [30] SECONDS.
14. Emergency lighting shall be provided at the door.

Submittal Requirements

15. A minimum of two (2) sets of plans and minimum of one (1) set of plans and specifications/cut sheets shall be submitted in PDF Format. The second set of plans shall be submitted on paper. Plans shall contain sufficient detail to enable the plan reviewer to accomplish a complete review.
16. Each submittal shall have a completed Kerrville Fire Marshal Permit Application.
17. Provide a written description of the operation of the Access-Control/Delayed Egress System in normal, loss of power, activation of a fire protection system and manual modes.
18. Drawings detailing the installation location and layout, including all hookups/integration into building systems (i.e. fire alarm) and wiring.
19. Submittal shall include:
    a. Scaled floor plan for the facility.
    b. Full equipment listing.
    c. Spec/cut sheet for senor.
    d. Manufacturer documentation for all parts and materials used in the project.

Additional Information

20. Plans approved by the City of Kerrville, Fire Marshal give authorization for construction and/or operation. Final approvals are subject to field verification. Any approval issued by the Fire Marshal does not release the contractor or property owner from the responsibility of full compliance with all applicable codes and ordinances relating to the construction project.
21. Installation, fabrication or otherwise construction of the system is prohibited without approved plans and permit.
22. All installations and/or operations must concur with the approved plans. Any deviation from the approved plans requires a re-submittal to the Fire Marshal's Office.
23. All fire marshal inspection forms and permits shall be kept in a permit packet on the job site until final inspection.

Inspection Requirements

24. *Magnetic-Lock/Push Bar Test:* Magnetic locks will be tested.
25. *Back-up Power Verification:* Test emergency backup power to the access control system, where provided
26. *Fail Safe Verification:* Loss of power, or function to that part of the access control system, which locks the doors, shall automatically unlock.
27. *Connection to Fire Sprinkler/Alarm System:* Activation of the building fire alarm or automatic sprinkler system, if provided, shall automatically unlock the doors. In addition, remain unlocked until the fire alarm system is reset.
28. *Manual Operation:* Manual operation of the access control system, independent of any automatic function, will be tested.
29. *Egress:* Electric strike, or designated access doors shall be tested to verify free egress

Section 5
Access Control Gates

These guidelines are to be followed when a building, facility, residential subdivision, or multi-family dwelling units, within the City of Kerrville, is provided with an approved, entry and exit access control/security gate for vehicular traffic and/or pedestrian traffic.

All access control criteria for the purposes of these guidelines and any other guidelines or requirements of the Fire Marshal shall conform to the International Fire Code 2006, as adopted and amended by the City of Kerrville.

This guide does not replace, nor supersede any codes and/or ordinances adopted by the City of Kerrville, or determinations and positions of the Fire Chief or Fire Marshal.

General Requirements for Manually Operated Security Gates

1. Gates shall not obstructed fire apparatus access roads in any manner. The minimum widths and clearances established shall be maintained at all times.
2. Manual gates shall open utilizing the Knox padlock that conforms to the Kerrville Fire Department Knox Security Key.

General Requirements for Power Operated Security Gate

3. Gates shall not obstructed fire apparatus access roads in any manner. The minimum widths and clearances established shall be maintained at all times.
4. Gates shall open using a Kerrville Fire Department apparatus door opener known as a Gate Key Switch.

General Requirements for Manual Back-up System on Power Operated Security Gates

5. A fail-safe manual back-up system shall be accessible on the entry side of the gate to allow access through the gate in the event of a power failure, or other failure of the electromechanical system.
6. On swing gates and barrier arms, this system shall be designed:
    a. To open manually by one person removing the Knox padlock and/or pin that is secured in the gate arm. and
    b. The Knox padlock is clearly visible and is easily accessible from the entry side of the gate.
7. On slide gate, this system shall be designed:
    a. To open manually by one person utilizing an approved single manual release device. and
    b. The manual release device is within 10 feet of the gate in a location that is clearly visible and is easily accessible from the entry side of the gate.
    c. Manual release device shall be located in a fire department approved weatherproof Box. *See Weatherproof Box requirements below.*

Pedestrian Walkway Security Gates

8. Security gates may be installed across pedestrian walkways provided they are designed to:
    a. Open electromechanically with the use of a manually operated Knox key switch Model 3502 using the Kerrville Fire Department Knox Security Key. When required by the chief, the system shall be designed to open multiple gates upon activation. In the event of a power failure, or other failure of the electromechanical system, a fail-safe system must automatically unlock the gate to allow free entry and exit.
    b. Open manually using a Knox padlock conforming to the Kerrville Fire Department Knox Security Key.
    c. Open manually utilizing an approved manual switch.

General Requirements Weatherproof Box

9. Weatherproof box shall comply with the following:
    a. Red in color.

b. At least 5 inches high, 5 inches wide and 1-1/2 inches deep.
c. Clearly labeled “Fire Dept.” in white block letters one inch tall with a one-quarter inch stroke.
d. Located within 10 feet of the gate.
e. Clearly visible and easily accessible. and
f. Designed to accept the Knox padlock that conforms to the Rockwall Fire Department Knox Security Key, when used with the manual release device.

Maintenance

10. The gate opening systems shall be maintained in approved operating condition as delineated below:
    a. The mechanical components shall be serviced on a regular basis and maintained in an approved operating condition.
    b. The electrical components shall be maintained in an approved operating condition. and
    c. A power supply shall be maintained to electronic components at all times.

Performance Test Required

11. Within 30 calendar days of each anniversary date subsequent to installation of an approved security gate system and other times as required, a performance test shall be conducted by the chief or designee.
12. Upon failure of the performance test, the security gate system shall be disabled and maintained in the open position until repaired, and tested by the chief or designee.

Submittal Requirements

13. A minimum of two (2) sets of plans and minimum of one (1) set of plans and specifications/cut sheets shall be submitted in PDF Format. The second set of plans shall be submitted on paper. Plans shall contain sufficient detail to enable the plan reviewer to accomplish a complete review.
14. Each submittal shall have a completed Kerrville Fire Marshal Permit Application.
15. Provide a written description of the operation of the access control/security gates in normal, emergency, and manual modes.
16. Site plan drawings of the installation location and layout, including primary and emergency power hookups.
17. Equipment location drawings of the actual configuration of the access gate(s).
18. A full equipment listing.
19. Manufacturer documentation for all parts and materials used in the project.
20. Plan drawings shall be generated by the installing company, and shall not be copied.

Additional Information

21. Plans approved by the City of Kerrville, Fire Marshal give authorization for construction and/or operation. Final approvals are subject to field verification. Any approval issued by the Fire Marshal does not release the contractor or property owner from the responsibility of full compliance with all applicable codes and ordinances relating to the construction project.
22. Installation, fabrication or otherwise construction of the system is prohibited without approved plans and permit.
23. All installations and/or operations must concur with the approved plans. Any deviation from the approved plans requires a re-submittal to the Fire Marshal’s Office.
24. All fire marshal inspection forms and permits shall be kept in a permit packet on the job site until final inspection.

Inspection Requirements

25. *Fire Lane Unobstructed.* The fire lane shall have a clear width of 24-feet.
26. *Fail-Safe/Manual mode Verified.* Test operation of Fail-safe/manual mode.
27. *Know Box Key Switch.* Test the operation of the Knox Box Key switch.
28. *Emergency Ingress system Tested.* Test openers and receivers.
29. *Access Control Gates Final:* Final inspection

Section 5
Outdoor Burning

These guidelines are to be followed when a person, general contractor, company and/or business or commercial and/or residential developer proposes to perform an organized outdoor burn and/or fire, within the City of Kerrville.

All outdoor burning operations for the purposes of these guidelines and any other guidelines or requirements of the Fire Marshal shall conform to the International Fire Code 2006, Texas Commission on Environmental Quality Rules and the City of Kerrville Fire Code Amendments.

This guide does not replace, nor supersedes any adopted codes and/or ordinances adopted by the City of Kerrville, or determinations and positions of the Fire Chief or Fire Marshal.

General Information
The City hereby adopts the outdoor burning rules set by Texas Commission on Environmental Quality as outlined in the Texas Administrative Code, Title 30, Part I, Chapter 111, Subchapter B, and as may be amended. If a conflict occurs between the Texas Administrative Code and this Section, the most stringent provision shall prevail.

On-site burning of trees, brush, and other plant growth for right-of-way maintenance, land clearing operations, and maintenance along water canals will be allowed when a practical alternative to burning does not exist and when the materials are generated only from that property. Sensitive receptors, such as neighboring properties, persons and animals must not be negatively affected by the burn. For a single project entailing multiple days of burning, an initial notice delineating the scope of the burn is sufficient if the scope does not constitute circumvention of the rule for a continual burning situation.

The Outdoor Burning Rule defines a "*practical alternative"* as an economically, technologically, ecologically, and logistically viable option. Methods that can be used are recycling, composting, mechanical chipping or mulching, logging, landfills and air-curtain incineration (trench burning).

The City may authorize outdoor burning for prescribed burning for forest, range, and wildland/wildlife management purposes pursuant to the issuance of a City permit. Such burning is prohibited where the Fire Marshal determines that the burning will have an adverse effect on any building or structure. In addition, the Fire Marshal may revoke the authority to burn at any time if the burning causes nuisance conditions, is not conducted in accordance with the specified conditions, violates any provision of an applicable permit, or causes a violation of any air quality standard.

If not otherwise authorized by the International Fire Code 2006, Texas Commission on Environmental Quality and the City of Kerrville Fire Code Amendments, outdoor burning may be authorized by City permit if there is no practical alternative and if the burning will not cause or contribute to a nuisance, traffic hazard or to a violation of any federal or state primary or secondary ambient air standard. The Fire Marshal may specify procedures or methods to control or abate emissions from outdoor burning authorized pursuant to this rule. The Fire Marshal may revoke the authority to burn at any time if the burning causes nuisance conditions, is not conducted in accordance with the specified conditions, violates any provision of an applicable permit, or causes a violation of any air quality standard.

The authority to conduct outdoor burning under this Section does not exempt or excuse any person responsible from the consequences, damages, or injuries resulting from the burning, and does not exempt or excuse anyone from complying with all other applicable laws or ordinances, regulations and orders of governmental entities having jurisdiction, even though the burning is otherwise conducted in compliance with this Section. Further, each permittee assumes all liability and responsibility for all damages to all persons or property caused by burning hereunder.

The Fire Marshal is authorized to revoke any person's or entity's right to conduct an outdoor burn and to pursue any legal recourse against the person or entity if the Fire Marshal determines that federal or state law, this Section, or a permit was violated.

General Requirements

1. A “practical alternative” must be pursued before an application for “Outdoor Burning” is made to the Kerrville Fire Marshal and the Texas Commission on Environmental Quality.
2. Submit a written request to the Texas Commission on Environmental Quality regional office for the prescribed burn and obtain an approved permit from the Texas Commission on Environmental Quality.
3. Submit a permit application to the Kerrville Fire Marshal in writing by the owner, operator, or other person in control of the property upon which the burning is to occur. The application shall be on a form provided by the Fire Marshal’s Office.
4. Obtain a copy of “Outdoor Burning in Texas” guide from the Kerrville Fire Marshal.
5. Submit a copy of an approved permit from the Texas Commission on Environmental Quality.
6. The permit shall be effective for the specific time period indicated on the permit.
7. The permit is effective only if the burn is conducted in strict compliance with and under the conditions specified in the permit.
8. Applicant shall obtain final approval to burn from the Fire Marshal’s office immediately prior to the start of burning, and at the beginning of each day upon which burning is to take place, to ensure that weather conditions are, and will remain, conducive to the type of burning authorized by the permit.
9. The Fire Marshal may void a permit in any instance where the Fire Marshal determines, in his sole discretion, that conditions have changed to the extent that the burn is no longer safe and poses a risk to the public health, safety, and welfare.
10. When the county is under a burn ban in conjunction with a city burn ban, a burning operation will not be allowed.
11. Burning is permitted only when wind direction and other meteorological conditions are such that smoke and other pollutants will not present a hazard to any public road, landing strip, navigable water, or have a negative effect on any building, structure, or sensitive receptor.
12. If at any time the burning causes, or may tend to cause, smoke to blow onto or across a street, road or highway, it is the responsibility of the person initiating the burn to post flag-persons on affected roads.
13. Fires shall be maintained at least 300 feet from any neighboring structure or sensitive receptors, unless prior written approval is obtained from the adjacent occupant with possessory control and such approval is submitted to the Fire Marshal prior to the burn.
14. Burn piles will need to have a clear distance of 100 feet from any living grass, brush and trees that are not intended to be burned.
15. Multiple piles will need to have a clear distance of 300 feet from each of the piles to be burned.
16. Notify the Kerrville Fire Marshal prior to burning for approval to commence burning operations.
17. The burning shall commence no earlier than 9:00 a.m. Burning shall be completed on the same day no later than one hour before sunset, and shall be monitored by a responsible party at all times during the active burn phase when the fire is progressing. In cases where residual fires and/or smoldering objects continue to emit smoke after this time, such areas shall be extinguished if the smoke from these areas has the potential to create a nuisance or traffic hazard condition. In no case shall the extent of the burn area be allowed to increase after this time. In order to allow time for the extinguishments of a fire, no new material shall be added to the burning pile after 3:00 p.m.
18. Any residual fires and/or smoldering objects that continue to emit smoke shall be extinguished each day at the end of the burn.
19. In cases where the “Outdoor Burning“ will occur over more than 1 day pursuant to a permit, the permittee or designee shall contact the Fire Marshal’s office each day of continued burning prior to the fire being lit, to determine whether, and under what conditions, burning will be allowed on that day.
20. Burning shall not be commenced when surface wind speed is predicted to be less than 6 miles per hour or greater then 12 miles per hour during the burn period.
21. Burning shall not be conducted during periods of actual or predicted persistent low-level atmospheric temperature inversions.

22. The permittee or designee shall be present at all times when a burn is active. Such person shall have a water hose connected to a reliable water supply or have other appropriate fire extinguishing equipment (bulldozer, water tankers, etc.) readily available for use.
23. Only brush/vegetation generated and gathered from the burn site area shall be permitted. There shall be no importation of brush from any other properties for the purpose of burning.
24. Electrical insulation, treated lumber, plastics, non-wood construction/demolition materials, heavy oils, asphaltic materials, potentially explosive materials, chemical wastes, and items containing natural or synthetic rubber must not be burned.

Plan Submittals

25. Each submittal shall have a completed Kerrville Fire Marshal Burn Permit application.
26. A copy of an approved permit from the Texas Commission on Environmental Quality.
27. A site plan/drawing of the proposed burn site area will include vehicle parking, buildings, obstructions, and roadways.
28. Designate the burn site and/or sites for multiple burnings.
29. List of materials to be burned.
30. List of equipment for containment and/or extinguishment of the materials to be burned.
31. A site evaluation will be conducted prior to approval of the application.
32. Plans approved by the City of Kerrville and the Fire Marshal's Office that gives authorization for operation. Final approvals are subject to field verification. Any approval issued by the Fire Marshal does not release the operators from the responsibility of full compliance with all applicable codes and ordinances relating to the bonfire or recreational fire.
33. All installations and/or operations must concur with the approved plans and permits. Any deviation from the approved plans requires a re-submittal of the plans to the Fire Marshal.
34. All Fire Marshal inspection forms and permits shall be kept in a permit packet on the site until completion of "Outdoor Burning" operations.

Section 6
Additional Guidelines Index

This section provides additional guidelines and policies. Please review and incorporate the requirements as needed in order to expedite the plan review process.

- **Knox Key Box**
- **Fire Lane Guidelines**
- **Fire Hydrants**
- **Water Flow (Fire) Testing of Fire Hydrants**
- **Fire Watch**

Section 6
Knox Key Box

These guidelines are intended to be a resource for when a building, structure, or facility, within the City of Kerrville, is required to be provided with a Knox Key Box.

All key boxes for the purposes of these guidelines and any other guidelines or requirements of the Fire Marshal shall conform to the International Fire Code 2006, as adopted and amended by the City of Kerrville.

This guide does not replace, nor supersede any codes and/or ordinances adopted by the City of Kerrville, or determinations and positions of the Fire Chief or Fire Marshal.

General Requirements

1. Knox Key Boxes can be purchased online at www.knoxbox.com. *See appendix for ordering information*
2. Key vault locations shall be approved by the Fire Marshal PRIOR to installation and shall be subject to the following conditions:
    a. Knox Key Boxes shall be located at the main entry into the building **and** at the fire sprinkler riser room.
    b. Knox Key Boxes shall in all cases be mounted within 10 feet of the designated entry.
    c. Knox Key Boxes shall not be visually or physically obstructed by landscaping or architectural elements.
    d. Knox Key Boxes shall not be mounted more than five (5) feet and not less than two feet above the surface level of the designated entry.
3. Keys necessary for entry shall be placed inside the box. Keys shall be properly labeled and be limited to one set attached to a substantially constructed key ring.
4. Fire Department alert decal shall be placed on all exterior doors in the upper left hand corner if the Knox Box is mounted on the wall left of the entry door and vise versus if mounted on the right side of the entry door. The City of Kerrville accepts no liability for security breeches resulting from the use of the key vault system. The system is the best available for addressing the complicated problem of rapid building access.

Where Required

5. The following structures and properties shall be equipped with a key lock security system box at or near their main entrance or at such other location as the Fire Marshal may require
6. Structures that are either equipped with, or required to be equipped with, fire sprinkler systems or fire systems or fire detection alarm systems that report to an alarm monitoring center
7. Multi-family residential structures that have restricted access through locked doors or gates and that have a common area or corridor for access to the living units
8. Buildings, that contain 6 or more occupancies within the same structure that have restricted common entryways and exit ways into the common area of the building.
9. Properties having mechanical gates that control vehicular and pedestrian access to commercial property or to private streets in subdivisions, apartment complexes, condominiums, or other residential developments which contain more then 2 residential units
10. Commercial properties with parking garages or secured parking and storage unit areas that will restrict access for emergency services.
11. All newly constructed structures subject to this Section shall have the key lock box installed and operational prior to the issuance of an occupancy permit.
12. Any existing structure subject to the key lock box requirement that does not have a key lock box installed and operational shall have the same installed as soon as practicable, but in no event later than 30 days after the effective date of these regulations.

Additional Information

13. In addition to the Knox Box system, locking caps for Fire Department Connections and Standpipes are required to secure water supplies for sprinkler systems.
14. Knox pad locks are required for gates and any other limited access point. Knox padlocks are also required for securing water valves in open areas or areas required by the Fire Marshal.
15. Access Gate Key Switches are required on limited access gates such as located at closed residential properties (apartment complex).

8 Plans approved by the City of Kerrville, Fire Marshal give authorization for construction and/or operation. Final approvals are subject to field verification. Any approval issued by the Fire Marshal does not release the contractor or property owner from the responsibility of full compliance with all applicable codes and ordinances relating to the construction project.

9 Installation, fabrication or otherwise construction of the system is prohibited without approved plans and permit.

10 All installations and/or operations must concur with the approved plans. Any deviation from the approved plans requires a re-submittal to the Fire Marshal's Office.

11 All fire marshal inspection forms and permits shall be kept in a permit packet on the job site until final inspection.

Section 6
Fire Lane Guidelines

These guidelines are intended to be resource for when a building, structure, or facility, within the City of Kerrville, is required to be provided with fire apparatus access roads or emergency access easement, commonly referred to as "Fire Lane" for Fire Department Access.

All fire lanes for the purposes of these guidelines and any other guidelines or requirements of the Fire Marshal shall conform to the International Fire Code 2006, as adopted and amended by the City of Kerrville.

This guide does not replace, nor supersede any codes and/or ordinances adopted by the City of Kerrville, or determinations and positions of the Fire Chief or Fire Marshal.

Fire Access Roads

1. Fire access roads are required when any portion of a building, structure or facility's first story exterior wall is located more than 150 feet from a point of fire department access as measured by an approved route (as the hose lays) around the exterior of the building, structure or facility.
2. Buildings or facilities exceeding 30 feet (9144 mm) or three stories in height shall have at least three means of fire apparatus access for each structure.
3. Buildings or facilities having a gross building area of more than 62,000 square feet (5760 m2) shall be provided with two separate and approved fire apparatus access roads. Exception: Projects having a gross building area of up to 124,000 square feet (11 520 m2) that have a single approved fire apparatus access road when all buildings are equipped throughout with approved automatic sprinkler systems.
4. Where two access roads are required, they shall be placed a distance apart equal to not less than one half of the length of the maximum overall diagonal dimension of the property or area to be served, measured in a straight line between accesses.

Aerial Fire Apparatus Access Roads

5. Buildings or portions of buildings or facilities exceeding 30 feet (9144 mm) in height above the lowest level of fire department vehicle access shall be provided with approved fire apparatus access roads capable of accommodating fire department aerial apparatus. Overhead utility and power lines shall not be located within the aerial fire apparatus access roadway.
6. Fire apparatus access roads shall have a minimum unobstructed width of 26 feet (7925 mm) in the immediate vicinity of any building or portion of building more than 30 feet (9144 mm) in height.
7. At least one of the required access routes meeting this condition shall be located within a minimum of 15 feet (4572 mm) and a maximum of 30 feet (9144 mm) from the building, and shall be positioned parallel to one entire side of the building.

Multiple-family Residential Developments

8. Multiple-family residential projects having more than 100 dwelling units shall be equipped throughout with two separate and approved fire apparatus access roads. Exception: Projects having up to 200 dwelling units may have a single approved fire apparatus access road when all buildings, including nonresidential occupancies, are equipped throughout with approved automatic sprinkler systems installed in accordance with the International Fire Code 2006 Section 903.3.1.1 or 903.3.1.2.
9. Multiple-family residential projects having more than 200 dwelling units shall be provided with two separate and approved fire apparatus access roads regardless of whether they are equipped with an approved automatic sprinkler system.

One –or-Two Family Residential Developments

10. Developments of one- or two-family dwellings where the number of dwelling units exceeds 30 shall be provided with separate and approved fire apparatus access roads. Exceptions: (1) Where there are more than 30 dwelling units on a single public or private fire apparatus access road and

all dwelling units are equipped throughout with an approved automatic sprinkler system in accordance with the International Fire Code 2006 Section 903.3.1.1, 903.3.1.2 or 903.3.1.3.3, access from two directions shall not be required. (2) The number of dwelling units on a single fire apparatus access road shall not be increased unless fire apparatus access roads will connect with future development, as determined by the fire code official.

11. Where two access roads are required, they shall be placed a distance apart equal to not less than one half of the length of the maximum overall diagonal dimension of the property or area to be served, measured in a straight line between accesses.

Fire Apparatus Access Roads during Construction

12. When fire apparatus access roads and water supplies for fire protection are required to be installed, such protection shall be installed and made serviceable prior to vertical construction, and shall remain serviceable during the time of construction.

Specifications

13. Fire lanes must meet the following criteria:
    a. Fire lanes must have a width of 24 feet
    b. A turning radius of 25-feet for buildings less than 30-feet in height or less than 3 stories
    c. A turning radius of 35-feet for buildings 30-feet or above in height and/or 3 or more stories in height.
14. Minimum clear vertical height clearance of 13 feet 6 inches feet.
15. Cannot exceed 10 percent in grade slope and not exceeding 5 percent on cross-slope.
16. Fire apparatus access roads shall be designed and maintained to support the imposed loads of fire apparatus and shall be surfaced so as to provide all-weather driving capabilities.
17. Facilities, buildings or portions of buildings hereafter constructed shall be accessible to fire department apparatus by way of an approved fire apparatus access road with an asphalt, concrete or other approved driving surface capable of supporting the imposed load of fire apparatus weighing at least 75,000 pounds (34 050 kg).
18. Where a fire hydrant is located on a fire apparatus access road, the minimum road width shall be 24 feet (7925 mm).
19. Where a fire hydrant is located on a fire apparatus access road, a blue reflective street marker will be installed in the middle of the access road to indicate a location of a fire hydrant.

Marking

20. Striping — Fire apparatus access roads shall be marked by painted lines of red traffic paint six inches (6") in width to show the boundaries of the lane. The words "NO PARKING FIRE LANE" or "FIRE LANE NO PARKING" shall appear in four inch (4") white letters at 25 feet intervals on the red border markings along both sides of the fire lanes. Where a curb is available, the stripping shall be on both the vertical and horizontal faces of the curb.
21. Signs — Signs shall read "NO PARKING FIRE LANE" or "FIRE LANE NO PARKING" and shall be 12" wide and 18" high. Signs shall be painted on a white background with letters and borders in red, using not less than 2" lettering. Signs shall be permanently affixed to a stationary post and the bottom of the sign shall be six feet, six inches (6'6") above finished grade. Signs shall be spaced not more than fifty feet (50') apart. Signs may be installed on permanent buildings or walls or as approved by the Fire Chief.

Fire Lane Turnarounds

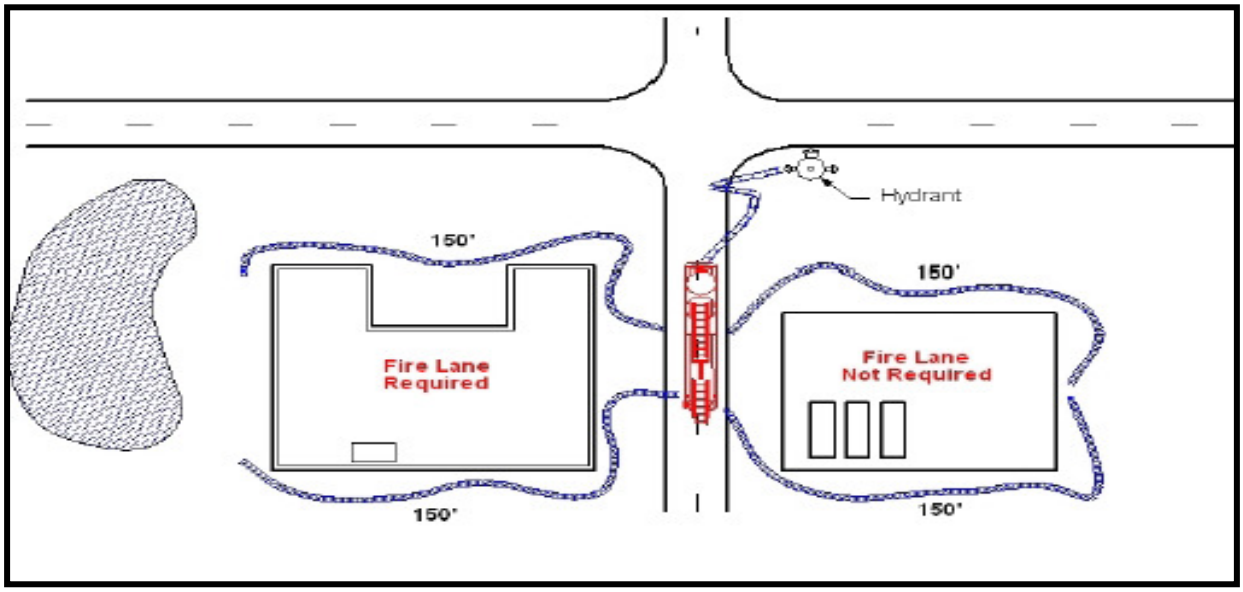
22. An approved hammerhead, cul-de-sac, or dead-end hammerhead turnaround must be provided for all dead end fire access roads in excess of 150 feet in length. Unless specifically approved by the Fire Department, parking or other obstruction within the required turnarounds is prohibited.
23. All approved turnarounds shall be marked and platted as fire lanes.
24. Cul-De-Sac. 47.5 foot minimum radius/ 95-foot diameter. Corner radius shall be per the fire lane width required.
25. Hammerhead. 60-foot minimum legs along the "T," as measured from centerline of the fire lane. Corner radius shall be per the fire lane width required.
26. Dead-End Hammerhead. 60-foot minimum intersection leg, as measured from centerline of the fire lane. Corner radius shall be per the fire lane width required.
27. Please see the *Approved Fire Lane Turnarounds* for representative graphics.

Plan Review

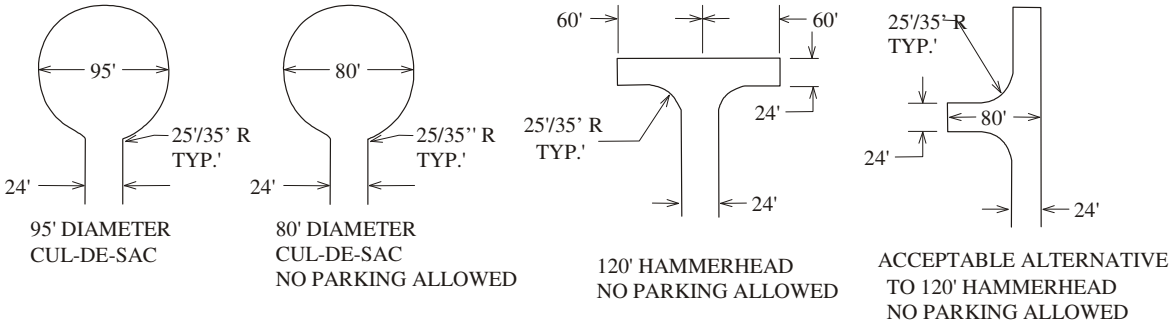
28. Fire lanes provided during the platting process shall be so indicated on the plat as an easement. Where fire lanes are provided and a plat is not required, the limits of the fire lane shall be shown on a site plan and placed on permanent file with the Fire Marshal and City Planning Department.
29. Plans for fire lanes must be submitted to the fire department for review and approval prior to construction.
30. Fire lane and access easements shall be provided to serve all buildings through parking areas, to service entrances of buildings, loading areas and trash collection areas, and other areas deemed necessary to be available to fire and emergency vehicles. The Fire Chief is authorized to designate additional requirements for fire lanes where the same is reasonably necessary to provide access for fire and rescue personnel.

150 ft. Rule Example

Below is a representative example of a method to determine if a fire lane is required based upon the 150 ft.



Approved Fire Lane Turnarounds



95' DIAMETER
CUL-DE-SAC

80' DIAMETER
CUL-DE-SAC
NO PARKING ALLOWED

120' HAMMERHEAD
NO PARKING ALLOWED

ACCEPTABLE ALTERNATIVE
TO 120' HAMMERHEAD
NO PARKING ALLOWED

Fire Lane Marking

- All fire lane markings must be legible from the center of the fire lane.
- 6-inch red strip with 4-inch white letters
- "NO PARKING FIRE LANE"
  —spaced every 25-feet

Section 6
Fire Hydrants

These guidelines are to be followed when a building, facility, residential subdivision, or multi-family dwelling units, within the City of Kerrville, is required to provide approved fire hydrants.

All fire hydrant criteria for the purposes of these guidelines and any other guidelines or requirements of the Fire Marshal shall conform to the International Fire Code 2006, as adopted and amended by the City of Kerrville and the City of Kerrville Engineering Standards.

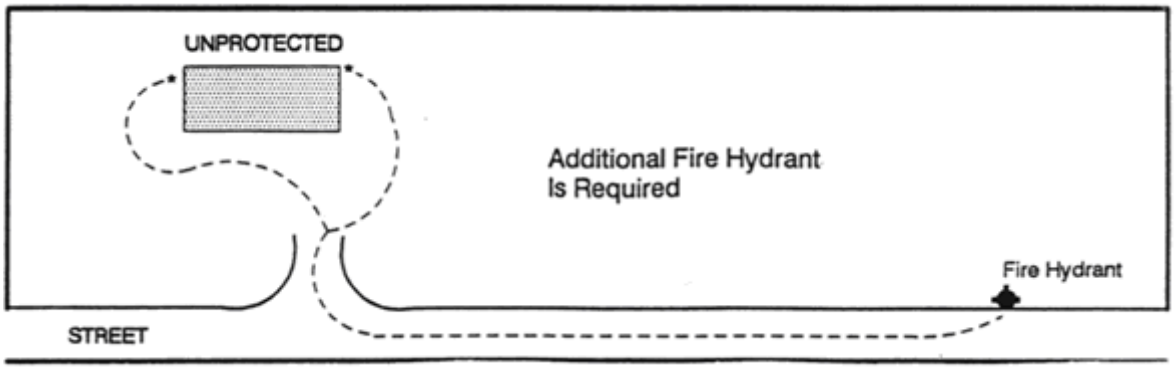
This guide does not replace, nor supersede any codes and/or ordinances adopted by the City of Kerrville, or determinations and positions of the Fire Chief or Fire Marshal.

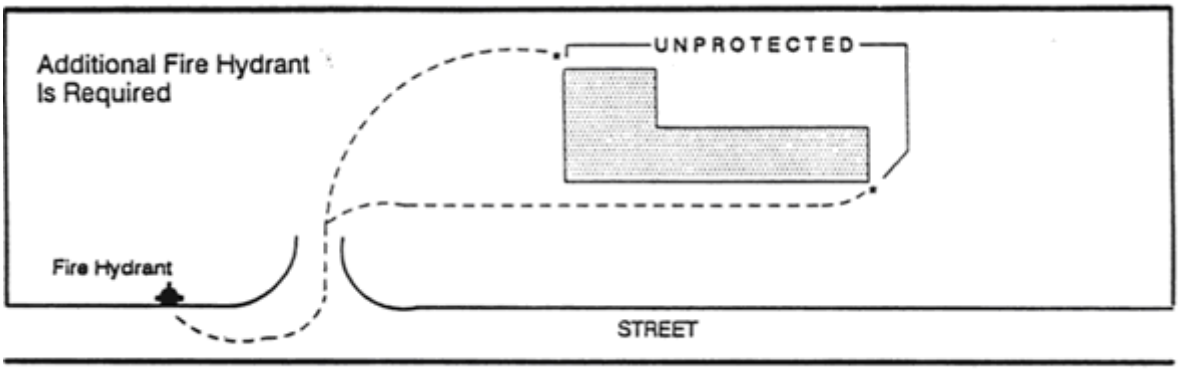
Water Supply

1. An approved water supply capable of supplying required fire flow for fire protection shall be provided to all buildings, as set forth in Appendix B of the International Fire Code 2006.
2. Total Fire Flow requirements depend upon the type of construction and number of square feet.
3. Fire flow for one-and two-family dwellings, which do not exceed 3,600 square feet, shall be 1,000 gallons per minute. Fire flow and flow duration for dwellings having a fire area in excess of 3,600 square feet shall not be less than that specified in Appendix B of the International Fire Code 2006.
4. In general, fire hydrants shall be located at each street intersection and at intervals on the interior of each block.
5. Fire Hydrants shall be within 25-feet of fire lane.
6. Fire Hydrants shall be required on the same side of the street that the building is being built upon, when the street is designated as a minor arterial or larger. All streets with median strips, regardless of size, shall have required fire hydrants on the same side of the street as the construction.
7. All required fire hydrants shall be in place and accepted before any construction continues above the slab.
8. A minimum of a three-foot (3') clear space shall be maintained around the circumference of all fire hydrants.
9. The location and number of fire hydrants connected to a water supply capable of delivering the required fire flow shall be provided as follows:
    a. Where a portion of the facility or building hereafter constructed or moved into or within the City of Kerrville is more then 500 feet from a hydrant, as measured by an approved route around the exterior of the facility or building, on-site fire hydrants and mains shall be provided.
10. A fire hydrant shall be installed no more than seventy five feet (75') from the Fire Department connection for a standpipe or automatic sprinkler system. The Fire Department Connection (FDC) shall be within twenty five feet (25') of a fire lane.
11. Where a fire hydrant is located on a fire apparatus access road, a blue reflective street marker will be installed in the middle of the access road to indicate a location of a fire hydrant.

500 ft. Rule Example

Below are representative examples of a method to determine if a fire hydrant is required based upon the hose lay requirements.





Section 6
Water Flow Testing for Fire Hydrants

These guidelines are to be followed when a building, facility, residential subdivision, or multi-family dwelling units, within the City of Kerrville, is required to have a water (fire) flow test completed..

All water flow testing criteria for the purposes of these guidelines and any other guidelines or requirements of the Fire Marshal shall conform to the International Fire Code 2006, as adopted and amended by the City of Kerrville, NFAP 13 2010, NFPA24 2010 and NFPA 25 2008 .

This guide does not replace, nor supersede any codes and/or ordinances adopted by the City of Kerrville, or determinations and positions of the Fire Chief or Fire Marshal.

Fire flow testing is the determination of actual flow conditions within a hydrant system. A hydrant system is the system of mains, whether looped or not, capable of providing fire flow to a site. A site may have one or more hydrant systems with different flow and pressure characteristics. Consult a water map or your utility plan to determine how many systems feed your site.

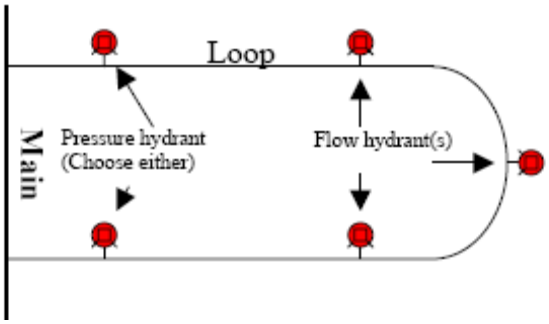
Available fire flow is measured in gallons per minute (gpm) at a residual pressure of 20 psi.

A Kerrville Fire Marshal Permit Application must be submitted to the fire marshal for review and approval. After submitting of application a date and time will be scheduled for the test. At this time a representative for the company making the application must be present to witness the test.

Water (Fire) Flow Testing Procedures

1. Decide which hydrant will be your pressure hydrant and which will be your flow hydrant(s). The pressure hydrant will be used to measure Static pressure and Residual pressure. It should be closer to a feed main than the flow hydrant. See Figure 1 below.

Figure 1



2. Decide how many flow hydrants to use. As a rule of thumb, you should flow enough hydrants at the same time such that the residual pressure drops at least 10% from the static pressure. For example, you take a static pressure of 140 psi from the cap gage. When you open a hydrant, the pressure drops to 135 psi. You need to open another hydrant.
3. Locate and perform the following on the pressure hydrant:
    a. Flush hydrant until water runs clear
    b. Install the cap gauge
    c. Open the hydrant slowly and fully
    d. Read and record the pressure. This is the Static Pressure.
4. Locate and perform the following on the flow hydrant(s):
    a. Record the inner diameter of the nozzle which will be flowed
    b. Insert a hand into the nozzle opening and feel the entrance shoulder to determine the nozzle coefficient (0.9 for a smooth rounded shoulder, 0.8 for a square shoulder, and 0.7 for a nozzle that protrudes into the barrel) (See Figure 4.7.1 below)
    c. Install and arrange any hoses or diffusers necessary to minimize effect on traffic or landscaping

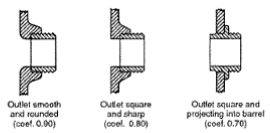


FIGURE 4.7.1 Three General Types of Hydrant Outlets and Their Coefficients of Discharge.

Flow Test
At this point, it would be helpful to have one or more assistants and a reliable method of communication such as two-way radios to perform an efficient test.

5. Open each flow hydrant slowly and fully. Open one hydrant at a time to avoid a pressure surge
6. Wait for the pressure at the pressure hydrant to stabilize, read and record this pressure. This is the Residual Pressure.
7. Then signal the persons stationed at the flow hydrants to take pitot readings, or go and takes readings yourself. The readings for residual pressure and the pitot readings should really be taken at the same time for an accurate flow.
8. To take a pitot reading, hold the pitot gauge approximately ½ of the diameter away from the nozzle in the center line of the nozzle. Read and record this pressure. This is your Pitot or velocity pressure.
9. If sediment appears, continue to flow water until the main has been flushed.
10. Close each flow hydrant, one at a time, **very slowly**. Closing a hydrant too fast will cause damage to the hydrant or to water mains.
11. Perform calculations as described under the Equations section below. If a residual pressure is unusually low, there may be a closed valve, which will need to be opened for an accurate flow test.
12. Repeat these steps if necessary.
13. There may be certain circumstances when there is only one hydrant, and a pressure hydrant cannot be located, or is too far down the line for an accurate measurement. In this case, use on 2½-inch outlet for the pressure readings, and the other 2½ inch or steamer cap for the flow readings. The cap gauge reading may fluctuate more in this case due to turbulence.

Equations
Fire flow, is measured consistently at 20 psi. In order to get the fire flow in gallons per minute (gpm) at 20 psi, the equations below will need to be performed.

A scientific calculator is useful in performing these equations. A standard calculator may be used to estimate where the 0.54 power is taken as a square root. Basic algebraic skills are required to perform these functions. The following equations are used to determine fire flow based on the static, residual (flowing), and pitot pressures:

Equation 1

$Q_r = 29.83 c_d D^2 \sqrt{P_p}$

Q_r = the residual flow at the pitot pressure measured in gpm
c_d = the friction loss coefficient (usually 0.9 for a smooth 2½" opening)
D = the diameter of the opening in inches
P_p = the pitot pressure in psi

Equation 2

$Q_f = Q_r \left((P_s - 20 / (P_s - P_r) \right)^{0.54}$

Q_f = the FIRE FLOW in gpm at 20 psi
P_s = the static pressure in psi
P_r = the residual pressure in psi

Example
You perform a hydrant test and gain the following results:
P_s (Static pressure) = 140 psi
P_r (Residual pressure) = 125 psi
P_p (Pitot pressure) = 120 psi
c_d = 0.9 because the inside of the nozzle was smooth.
D = 2.5 inches

Calculate Q_r (residual flow):
= 29.83 × 0.9 × $(2.5)^2$ × square root of 120
= 29.83 × 0.9 × 6.25 × 10.95
= 1,837 gpm
Calculate Q_f (fire flow):
= 1837 x **(**(140-20)/(140-125)**)** $^{0.54}$
= 1837 x (120/15) $^{0.54}$
= 1837 (8) $^{0.54}$ x (raise 8 to the 0.54 power)
= 1,837 × 3.07375
= 5,646 gpm

That system has the capacity to flow 5,646 gallons per minute at 20 psi residual pressure.

Section 6
Fire Watch

These guidelines are to be followed when a building, or facility, within the City of Kerrville, provided with a required fire protection system is out of service. In addition, any other time a fire watch has been required by the Fire Chief or Fire Marshal.

Fire Watches for the purposes of these guidelines and any other requirements of the Fire Marshal shall conform to the International Fire Code 2006, as adopted and amended by the City of Kerrville.

General Fire Watch Requirements

1. **Fire Watch.** A temporary measure intended to ensure continuous and systematic surveillance of a building or portion thereof by one or more qualified individuals or standby personnel when required by the code official, for the purposes of identifying and controlling fire hazards, detecting early signs of unwanted fire, raising an alarm of fire and notifying the fire department.
2. A representative of the building, or facility, shall contact the Fire Marshal's Office a minimum of 72 hours prior to a planned impairment, or immediately when impairment is not planned, to coordinate personnel for the Fire Watch.

Excerpts from the International Fire Code

3. **901.7 Systems out of service.** Where a required fire protection system is out of service, the fire department and the fire code official shall be notified immediately and, where required by the fire code official, the building shall either be evacuated or an approved fire watch shall be provided for all occupants left unprotected by the shut down until the fire protection system has been returned to service.
4. **901.7.1 Impairment coordinator.** The building owner shall assign an impairment coordinator to comply with the requirements of this section. In the absence of a specific designee, the owner shall be considered the impairment coordinator.
5. **901.7.2 Tag required.** A tag shall be used to indicate that a system, or portion thereof, has been removed from service.
6. **901.7.3 Placement of tag.** The tag shall be posted at each fire department connection, system control valve, fire alarm control unit, fire alarm annunciator and fire command center, indicating which system, or part thereof, has been removed from service. The fire code official shall specify where the tag is to be placed.
7. **901.7.4 Preplanned impairment programs.** Preplanned impairments shall be authorized by the impairment coordinator. Before authorization is given, a designated individual shall be responsible for verifying that all of the following procedures have been implemented: 1. The extent and expected duration of the impairment have been determined. 2. The areas or buildings involved have been inspected and the increased risks determined. 3. Recommendations have been submitted to management or building owner/manager. 4. The fire department has been notified. 5. The insurance carrier, the alarm company, building owner/manager, and other authorities having jurisdiction have been notified. 6. The supervisors in the areas to be affected have been notified. 7. A tag impairment system has been implemented. 8. Necessary tools and materials have been assembled on the impairment site.
8. **901.7.5 Emergency impairments.** When unplanned impairments occur, appropriate emergency action shall be taken to minimize potential injury and damage. The impairment coordinator shall implement the steps outlined in the International Fire Code 2006 Section 901.7.4.
9. **901.7.6 Restoring systems to service.** When impaired equipment is restored to normal working order, the impairment coordinator shall verify that all of the following procedures have been implemented: 1. Necessary inspections and tests have been conducted to verify that affected systems are operational. 2. Supervisors have been advised that protection is restored. 3. The fire department has been advised that protection is restored. 4. The building owner/manager, insurance carrier, alarm company and other involved parties have been advised that protection is restored. 5. The impairment tag has been removed.

Section 7
Inspection Process Index

This section facilitates inspections. Included are the most frequently found required inspections.

- **Inspection Request Procedures**
- **Summary of Required Inspections**
- **Inspection Process Details**
- **Certificate of Occupancy/Fire Marshal Final Inspection Details**

Section 7
Inspection Requests and Procedures

The following guidelines shall be used when calling for inspection requests:

1. All inspection requests shall be coordinated by dialing (830) 257-8449.
2. ***Contact our office at least 48 hours in advance of the requested inspection date and time.***
3. We are not able to accommodate same day inspections, without prior approval by the Fire Marshal.
4. The following information must be provided when requesting an inspection:
    a. Fire Marshal issued permit number.
    b. Name of project.
    c. Address of project.
    d. Fire protection contractor's company name.
    e. Fire protection contractor contact name and telephone number.
    f. Type of inspection requested.
    g. Other information as required, or requested.
5. **An inspection will not be scheduled without a valid permit number.**
6. A representative of the requesting company must be present at time of inspection.
7. Permit must be kept on the job site, and presented to the inspector upon request.
8. ***Fire Marshal approved, stamped, and signed plans must be kept on the job site and presented to the inspector upon request. Contractor shop drawings are not considered approved plans.***
9. ***There will be an automatic failed inspection if the approved plans and permit are not on-site at the time of inspection.***
10. ***Fire Protection System Permit – shall be posted near the entrance to the building or kept in the a permit jacket in the construction trailer at all times until the Certificate of Occupancy is issued.***
11. Provide all previous inspection forms within the permit jacket.

Section 7
Summary of Required Inspections

The Fire Marshal and/or Fire Inspector may request additional inspections as needed.

Only those pertaining to your particular project will be required. The below inspections shall not be considered absolute, and additional inspections and permit not listed below may be required based upon the project type and complexity.

1. Fire Sprinkler Underground
   a. Underground Hydrostatic Test
   b. Underground Flush
   c. Underground Visual
   d. Verify Size of Thrust Blocks
   e. Verify Depth of Bury - 48 inches
2. Fire Sprinkler Overhead
   a. Aux / ITC Drain Locations
   b. Overhead Hydrostatic Test
   c. 24-hr air test *(Dry System Only)*
   d. Compressor test *(Dry System Only)*
   e. Riser Main Drain Test
   f. Overhead Visual
   g. Knox Locking FDC Caps
   h. Dry Pipe Trip Test (Under 60 seconds)
   i. Dry-Pipe Trip Test
   j. Hangers
   k. Antifreeze Levels
   l. FDC Location
   m. Signage and Labels
3. Fire Alarm
   a. Audible Device Test
   b. Visual Device Test
   c. Initiating Device Test
   d. Waterflow Test
   e. Central Station Monitoring
   f. Device Address Test
   g. Visual
   h. Rough Wiring
   i. Exterior NAC Supervision Test
   j. Surge Suppressor on AC Line
4. Kitchen Hood
   a. Air Test
   b. Utility Shut-off Test
   c. Manual Pull Station
   d. Audible/Visual Notification
   e. Fire Alarm System Connection
   f. Class K Fire Extinguisher
5. Underground Storage Tank
   a. Line Test
   b. Anchors In Place
   c. Foundation
   d. Leak Detection
   e. Dry Sumps
   f. Overfill Prevention Device/Alarm Monitoring
   g. Emergency Shut-Off

h. Secondary Containment
i. Underground Final

6. Above ground Storage Tank
   a. Line Test
   b. Tank Testing Documentation
   c. Tank Label Visible
   d. Secondary Containment
   e. Overfill Prevention Device/Alarm
   f. Fire Extinguisher
   g. Normal/Emergency Vent Sizes
   h. Vehicle Impact Protection
   i. Anchors In Place
   j. Diking/Containment
   k. Foundation
   l. Leak Detection
7. Access Control Gates
   a. Fire Lane Unobstructed
   b. Back-Up Power Verified
   c. Knox Key Switch (KS-2)
   d. Drop Chain/Knox Padlock
   e. Manual Operation
   f. Access Control Gates Final
8. Access Control
   a. Mag-Lock/Push Bar Test
   b. Back-Up Power Verified
   c. Fail-Safe Verification
   d. Connected to Fire Alarm System
   e. Mechanical Crash Bar Verification
9. Hazardous Materials
   a. All Fire Protection Systems Operable
   b. Permit is Posted
   c. Permitted Quantity is not exceeded.
   d. Controls in Place
   e. Date of Issue
10. High-Piled Storage
   a. All Fire Protection Systems Operable
   b. Permit is Posted
   c. Storage Height Not Exceeded
   d. Signage and Stripping
   e. All Exits and Access Doors Clear
11. Model Rocketry
   a. RSO, Parts, Recovery, Power Limits
   b. Launch Site
   c. Launch Safety
   d. Weather Conditions
   e. Approval by Fire Marshal
12. Tent Permit
   a. Fire-Retardant Tent Material
   b. Adequate Exiting
   c. Fire Extinguisher Present
   d. Minimum 20ft Clear
   e. Appropriate Signage
   f. No Open Flames
13. Building Construction Items
   a. Fire rated walls and sealant
   b. Fire rated wall penetrations
   c. Fire curtains or smoke barriers
   d. Fire/Smoke dampers

e. Labeling
f. Fire rated doors
g. Stage curtains
h. Exit signs
i. Emergency lighting
j. Portable fire extinguishers
k. Door hardware
l. Fire lane
m. Fire hydrants
n. Knox box
o. Elevator
p. Designated smoking areas
q. Boilers and boiler room

14. Certificate of Occupancy (C.O.)
    a. Completed Inspections
    b. Additional Information: As-built drawings or additional requested material provided.
    c. Project Complete: Project is 100% completed. Section 6 contains the inspection requirements for performing a C.O. All required inspections must be completed and signed off, prior to C.O. approval.
15. Fire Pump
    a. Phase Reversal
    b. Flow Test of Min, Rated & Peak
    c. Load Start Test
    d. Pump Acceptance Test
    e. Controller Acceptance Test
    f. Pressure Start Test
    g. Jockey Pump
    h. Battery Backup
    i. Electrical Connections
    j. Fuel/Power Supply
16. Standpipe
    a. Auxiliary Drain Locations Adequate
    b. Overhead Hydrostatic Test
    c. Overhead Visual
    d. Flush
    e. Knox FDC Caps
    f. Adequate Clearance to Valves
    g. Dedicated Permanent Signage
    h. Appropriate Signage
    i. 2-½ to 1-½ reducers
    j. Hangers/Secure Mounting
    k. Manual Dry Monitored by 10 PSI Air
    l. Full Flow Design Test
17. Compressed Gas Storage
18. Clean Agent Suppression System
19. High-Piled Storage
20. Hazardous Materials
21. Liquefied Petroleum Gas
22. Model Rocketry
23. Low Explosives
24. Pyrotechnics
25. Propane Exchange
26. Smoke Exhaust / Control / Pressurization
27. Special Amusement

Tenant Finish-Out
All other inspections, with the exception of the sprinkler overhead, shall be per New Construction.

28. Fire Sprinkler Overhead (Twenty (20) or more Add or Relocate Sprinkler Heads)
    a. Hydrostatic Test *(200 psi for 2 hours)*:
    b. Visual
    c. Flush
    d. Fire Sprinkler Final
29. Fire Sprinkler Overhead (Less than Twenty (20) or more Add or Relocate Sprinkler Heads)
    A. Visual *(leaks, hangers, etc.)*
    B. Fire Sprinkler Final

Section 7
The Inspection Process Details

The Fire Marshal and/or Fire Inspector may request additional inspections as needed.

See Inspection Requests and Procedures, for the guidelines to use when calling for inspection requests.

Governing Documents
All tests and installation must comply with, but not limited to, City of Kerrville Ordinance, the International Fire Code 2006 Edition, and applicable NFPA Codes.

1. **Fire Sprinkler Underground**
   a. *Visual:* All underground piping and joints must be uncovered and exposed, with labeling of the pipe legible from grade. All thrust blocks will be visually inspected and must be uncovered and exposed to grade. Depth of bury of the pipe shall be measured and verified. All ductile iron, retaining rods, and other non-plastic components shall be externally coated for corrosion and poly wrapped.
   b. *Hydrostatic Test:* Underground piping will have to passed the visual inspection. The test will be at 200 psi or at 50-psi pressure in excess of the maximum static pressure when the maximum static pressure exceeds 150 psi, for a minimum of two hours. Testing to be from the gate valve to the top of the spigot, plus or minus 5 psi allowed.
   c. *Flush:* Upon completion of the underground hydrostatic test, the underground piping will be flushed, witnessed by the Fire Department. Proper methods and equipment to perform the flush must be used. All piping used to flush must be properly secured or retrained. Hoses may be used. Field Fire Inspector must approve of flushing method and equipment. **The flushing must be completed prior to stacking the riser to the overhead piping.**
   d. *Fire Sprinkler Underground Final:* Final Fire Marshal sign-off of completion of all inspections and the receipt of all State require paperwork.

2. **Fire Sprinkler Overhead**
   Do not stack the riser until the underground flushing has been completed. Check Fire Sprinkler Underground permit for verification of completion.
   a. *Visual*: All overhead piping and joints must be uncovered and exposed, with labeling of the pipe legible from the floor. All hangers will be visually inspected and must be uncovered and exposed to the floor.
   b. *Overhead Hydrostatic Test*: Overhead piping will be visually inspected with all joints exposed and labeling of the pipe turned downward. The test will be at 200 psi for a minimum of two hours. Plus or Minus 5 psi allowed.
      1. A hydrostatic test is required for all new installations.
      2. A hydrostatic test is required for all modifications/tenant finish-out with twenty or more sprinkler heads added and/or relocated.
   c. 24-hour air test: The test will be conducted at 40 psi of air for 24-hours with less than 1.5 psi loss.
   d. *Trip Test*: Operational test of the dry-pipe valve is performed and the quick opening device (500+ gallon systems) is tested, 750+ gallon systems must trip within 90 seconds.
   e. *Compressor Test:* Dry system compressor fills the system within 30 minutes.
   f. *Riser Main Flush*: Upon completion of the overhead hydrostatic test, the overhead piping will be drained and witnessed by the Fire Marshal.
   g. *Riser Room:* Verify riser room requirements, including floor drain for fire pumps, heat, light, markings, spare sprinkler head box and wrench, etc.
   h. *Standpipe and Fire Department Connection (FDC)*: Hydrostatic testing if not already done, the test will be at 200 psi for a minimum of two hours. Plus or minus 5 psi allowed. A flow test at hydraulically most remote standpipe through FDC to verify required pressure and flow.

i. *Fire Pump:* Hydrostatic testing (if not already done, the test will be at 200 psi for a minimum of two hours. No pressure drop or gain allowed.), all piping flushed, pump room requirements verified, and operational test conducted by manufacture witnessed by the fire marshal.
j. *Fire Sprinkler Final*: Final Fire Marshal sign-off at completion of all inspections and the receipt of all State require paperwork. *The inspection shall be conducted when all sheet rock and millwork is completed. The objective of this inspection is to verify that coverage is adequate after the initial hydrostatic test. This will give the Fire Marshal and the contractor(s) the opportunity to make any changes before there is a request for a Certification of Occupancy. Sprinkler heads must be clean and free from paint, construction debris, or other conditions that would affect the proper operation of the sprinkler-heads.*

3. **Fire Alarm**
   a. *Rough Wiring/ above ceiling:* All fire alarm wiring will be inspected for proper installation and penetration of any firewalls. *Fire alarm wiring shall not be tied to ceiling grid wire.*
   b. *Audible Device Test*: Ensure audible notification devices provide occupant notification for all areas without strobe devices.
   c. *Visual Device Test*: Ensure that all areas that do not have audible notification have visual coverage.
   d. *Initiating Device Test*: Test all smoke detectors and/or fire alarm initiating devices for Alarm and/or Standby conditions.
   e. *Water flow*: The water flow alarm will be tested by opening the inspectors test connection. The time delay feature on the flow switch switches must be set to a maximum delay of 90 seconds.
   f. *Central Station Monitoring*: Alarms and/or trouble signals are required to be monitored by a UL listed Central Station. Standard response to contact Fire Department shall be within 90 seconds.
   g. *Device Address Test*: All analog or addressable system will have all devices pulled and/or activated. The print out must comply with the devices that were pulled.
   h. *Final*: Final inspection.

4. **Kitchen Hood**
   a. *Air Test:* The nozzles protecting the cooking appliance shall be tested with compressed air to simulate activation.
   b. *Utility Shut-off Test*: All utilities connected to the protected cooking devices, shall have automatic shut-off valves.
   c. *Manual Pull Station Test*: Operation of the manual pull station shall bring about full system operation.
   d. *Audible/Visual Notification*: Audible and/or visual notification devices shall be tested.
   e. *Fire Alarm Connection*: Automatic fire-extinguishing systems shall be monitored by the building fire alarm system in accordance with NFPA 72.
   f. *Final:* Final inspection.

5. **Underground Storage Tank**
   a. See **Installation Checklist for Underground Storage Tanks** for all required inspections.

6. **Aboveground Storage Tank**
   a. See **Installation Checklist for Aboveground Storage Tanks** for all required inspections.

7. **Access Control Gates**
   a. *Fire Lane Unobstructed.* The fire lane shall have a clear width of 24-feet.
   b. *Fail-Safe/Manual mode Verified.* Test operation of Fail-safe/manual mode.
   c. *Know Box Key Switch.* Test the operation of the Knox Box Key switch.
   d. *Emergency Ingress system Tested.* Test openers and receivers.
   e. *Access Control Gates Final:* Final inspection.

8. **Access Control**
   a. *Magnetic-Lock/Push Bar Test:* Magnetic locks will be tested.

b. *Back-up Power Verification:* Test emergency backup power to the access control system, where provided
c. *Fail Safe Verification:* Loss of power, or function to that part of the access control system, which locks the doors, shall automatically unlock.
d. *Connection to Fire Sprinkler/Alarm System:* Activation of the building fire alarm or automatic sprinkler system, if provided, shall automatically unlock the doors. In addition, remain unlocked until the fire alarm system is reset.
e. *Manual Operation:* Manual operation of the access control system, independent of any automatic function, will be tested.
f. *Egress:* Electric strike, or designated access doors shall be tested to verify free egress

9. **Hazardous Materials**
   a. *Permit Posted*: Permit is clearly posted near the entrance to the occupancy.
   b. *Permitted Quantity is not exceeded*: The quantities permitted are not exceeded.
   c. *Controls in Place*: Administrative and/or containment controls are in place. Proper storage requirements are provided for the quantity of materials stored. Non-compatible materials shall be properly segregated.
   d. *Placard:* Required NFPA 704 diamond placard posted.
   e. *Date of Issue*: Permit is valid for one year from date of issue.

10. **High-Piled/High-Racked Storage**
   a. *Permit Posted*: Permit is clearly posted near the entrance to the occupancy.
   b. *Permitted Quantity is not exceeded*: The quantities permitted are not exceeded.
   c. *Controls in Place*: Administrative and/or containment controls are in place. Proper storage requirements are provided for the quantity of materials stored. Non-compatible materials shall be properly segregated.
   d. *Date of Issue*: Permit is valid for one year from date of issue.

11. **Building Construction Items**
   a. *Fire rated walls and sealant*. Inspect all fire rated walls and sealant at the deck.
   b. *Fire Wall penetrations.* Inspect all fire rated wall penetrations and sealant of those penetrations.
   c. *Fire curtains or smoke barriers.* Inspect any fire curtains or smoke barriers.
   d. *Fire/Smoke Dampers.* Inspect all fire/smoke dampers in fire rated walls.
   e. *Labeling.* Inspect labeling on ceiling grid, which indicates fire, and smoke dampers. (Fire Damper / Smoke Damper)
   f. *Fire Rated Doors.* Inspect all fire rated doors jambs, doors, smoke seals, and door closures on fire rated doors.
   g. *Stage Curtains*. Inspect any stage curtains for fire rating.
   h. *Exit Signs*. Inspect all exit signs and test.
   i. *Emergency Lighting*. Inspect all emergency lighting and test.
   j. *Portable Fire Extinguishers*. Inspect all portable fire extinguishers size, location of devices, and for state tag.
   k. *Door Hardware*. Inspect all door hardware on means of egress. (Panic hardware, thumb latch, locks, etc.)
   l. *Fire Lane*. Inspect fire lane striping.
   m. *Fire Hydrants*. Inspect all fire hydrants for color-coding, obstructions, and protective barriers if applicable.
   n. *Knox Box*. Inspect Knox box placement and place master key and all other emergency keys inside it.
   o. *Elevator*. Inspect elevator and all operational equipment. Firefighter re-call tested. Must have State Elevator inspection record and certificate posted.
   p. *Designated smoking areas*. Inspect all designated smoking areas for signage and proper ashtrays.
   q. *Boilers*. Inspect any boilers and boiler room. Must have State boiler inspection posted.

12. **Certificate of Occupancy (C.O.)**
    a. *Completed Inspections*: All required fire protection inspections completed.
    b. *Additional Information*: As-built drawings or additional requested material provided.
    c. *Project Complete*: Project is 100% completed. Section 6 contains the inspection requirements for performing a C.O. Inspection.

Section 7
Certification of Occupancy/ Fire Marshal Final

This guideline is intended as a resource to assist building owners and general contractors in receiving a Certificate of Occupancy, commonly referred to as a C.O, for their business. These premises are inspected to identify fire related hazards and conditions. Listed below are the most commonly found fire code violations. This list is not inclusive of all fire code requirements.

The below listed items must be in compliance prior to making an appointment for Fire Department personnel to inspect the facility. An annual Fire Prevention Inspection will also be conducted at the business using these same guidelines.

Exterior Features

1. All fire lanes are clear, unobstructed, and striped per City of Rockwall standards.
2. Fire hydrants shall be completed and in working order prior to construction.
3. No accumulation of waste material.
4. Fire Department Connection (FDC) unobstructed with caps in place, and within 75 ft. of a fire hydrant and 25 of fire lane, provided with a 5-foot wide unobstructed pathway from fire lane with an all-weather walking surface.
5. Address on front in 12" numbers and rear in a minimum of 4" numbers, legible from the street and fire lane.
6. Address listing on electric and gas meters and/or disconnecting means.
7. Knox Box located at the main entrance and/or riser room.

General

8. Storage clearance: unsprinklered 24" to ceiling. sprinklered 18" to sprinkler heads
9. Sprinkler heads clear of paint / overspray
10. All ceiling panels in place
11. Clearance in front of electrical panel (36").
12. Slots in electrical panels must be filled by blanks and all electrical receptacles have cover plates.
13. Occupancy load posted.
14. Fire rated assemblies properly constructed and penetrations sealed.
15. Extension Cord / multiple adapters utilized per code.
16. Abatement of electrical hazards.
17. Mechanical/electrical/boiler rooms free from storage and combustibles.
18. Gasoline stored in proper location / container.
19. General housekeeping and precautions against fire.
20. Wall and ceiling finishes shall be in accordance with the 2006 International Fire Code, for all corridors, rooms and enclosed spaces. Field tests on interior finishes may be required.
21. All required tenant separation wall/demising wall shall be a minimum of 1hr fire rated construction.
22. All fire rated assemblies and fire doors intact.

Exits

23. Accessible means of egress.
24. Exits unlocked.
25. Exits are not blocked
26. Exit lights operational
27. Emergency lighting operational
28. All exit doors located in the means of egress that are capable of locking or latching shall be operable from the inside without the use of a key, tool or any special knowledge or effort, or provided with approved panic hardware.

Fire Protection Equipment

29. Portable fire extinguisher serviced within 1 year or manufactured in current calendar year

30. Minimum 2A-1O:BC fire extinguishers per 3000 sq. ft, with a maximum travel distance of 75 ft. from any point within the building.
31. Sprinkler system “Green Tagged,” in-service and deemed operational.
32. Alarm system “Green Tagged,” in-service and deemed operational.
33. Kitchen hood and/or spray booth system “Green Tagged,” in-service and deemed operational.
34. Other fire protection systems “Green Tagged,” in-service and deemed operational.
35. Approved plans and permits on-site.
36. All devices installed according to plans.
37. Fire protection equipment room(s), riser room, labeled and access provided.
38. Access control system/gates in-service and deemed operational.
39. Arrangement of interior walls and/or drop ceiling shall not interfere with the operation of the fire sprinkler system.
40. Fire doors unblocked/operational
41. Provide spare sprinklers and wrench in cabinet
42. All fire department inspection forms and permits shall be kept in a permit packet on the job site until final CO inspection.
43. Will any type of special protection system be required? (i.e. ventilation, smoke dampers, fire alarm, fire sprinkler, kitchen hood storage tank)

Section 8
Specialty Requirements Index
Inspections and Requirements

This section facilitates inspections and additional requirements. Included are the most frequently found required inspections.

- **Special Amusement Buildings**
- **Propane Exchange**
- **Underground Storage Tank Removal**
- **Fire Sprinkler Underground Inspection**
- **Asphalt Kettles and Tar Pits**

Section 8
Special Amusement Buildings

Purpose
To establish minimum fire and/or life safety guidelines for the use and operation of "Haunted Houses, Scare Houses or Haunted Mazes" within the City of Kerrville.

Scope
These guidelines are intended to apply to "Haunted Houses, Scare Houses or Haunted Mazes" which typically operate during the Halloween season at special community, school or local fund raising events. They may also apply to similar commercial activities such as carnivals and other seasonal amusement activities.

These guidelines are necessarily general in scope and should be applied with appropriate professional judgment and common sense in consideration of the overall fire and life safety situation.

This guide does not replace, nor supersede any adopted codes and/or ordinances adopted by the City of Kerrville, or determinations and positions of the Fire Chief or Fire Marshal.

Definition
SPECIAL AMUSEMENT BUILDING. A building that is temporary, permanent or mobile that contains a device or system that conveys passengers or provides a walkway along, around or over a course in any direction as a form of amusement arranged so that the egress path is not readily apparent due to visual or audio distractions or an intentionally confounded egress path, or is not readily available because of the mode of conveyance through the building or structure.

Fire and Life Safety Guidelines
By nature, many of these types of facilities are unique; thus, the fire safety concerns are unique and must be evaluated accordingly. Special attention should be given to overall exit arrangement, exit travel distance, exit and emergency lighting, use of flammable liquids and combustible interior finish and construction materials, use and operational condition of fire detection, alarm and extinguishing equipment, use of special effects, adequate trained and supervised staff, established emergency procedures, and readily available means to notify local fire, police and emergency medical services. For added safety, it may be necessary to limit occupant load, add additional emergency exits or establish other special precautions to minimize a potential risk due to some unique circumstance. In any event, every effort should be made to provide an enjoyable but fire safe environment as determined by the local fire inspection authority

General Requirements
In general, such facilities shall comply with the provisions of both the International Fire Code 2006 and the International Building Code 2006, and shall be classified as a "Special Amusement Building" as defined in Chapter 2.

Materials and Construction
1. Highly flammable materials such as cotton batting, straw, dried plant material, certain plastics, etc. shall not be used for decorations or construction.
2. Avoid use of combustible material in displays. If used, combustibles must be treated with an approved commercial flame-retardant treatment. Samples of all such materials must be submitted to this office for flame tests prior to use.
3. Construction of interior partitions, cubicles, mazes and the like shall be of non-combustible materials such as gypsum wallboard on wood or metal studs, brick, concrete block, plaster, etc. Under no circumstances shall the extensive use of exposed plywood, wood paneling or wood frame partitions be allowed where such material would substantially contribute to the ignition, spread or intensity of a fire. Use of fire retardant treated materials shall be restricted since may

such products tend to produce unacceptably high levels of smoke when exposed to fire. In any case, interior construction materials shall be consistent with the general type of construction of the building.

4. Extension cords, multiplug adapters, and non-fused power strips are not permitted. Only UL Approved circuit breaker strips or NEC approved wiring methods are permitted.
5. Maintain all exits in a clear and useable condition.
6. The interior finish shall be Class A in accordance with Section 803.1. Flame Spread 0-25; Smoke Developed 0-450. Combustible material shall be flame resistant. Foam plastics shall not be used other than trim.
7. Use of draperies, cardboard and flammable vinyl materials for use as interior finish or display purposes shall not be used unless they are inherently flame resistive, self-extinguishing or otherwise fire retardant treated in an approved manner as per NFPA 701.
8. Under no circumstances shall the use of exposed urethane foam, foam rubber or similarly highly combustible "cushion" or "molded" material be allowed, unless such material is covered or otherwise protected by gypsum wallboard, plaster or other non-combustible covering providing at least a 15 minute fire resistance rating.
9. All wiring and electrical appliances must comply with the National Electrical Code, NFPA 70. A licensed electrician shall install all wiring. Special attention should be given to assure adequate clearance is provided between electrical appliances subject to heated surfaces and nearby combustible materials. All electrical wiring and electrical appliances shall be subject to inspection by an approved electrical inspection agency.
10. Smoking and the use of pyrotechnic devices (fireworks) or open flame devices such as cigarette lighters, candles, canisters, kerosene lamps, kerosene heaters, flash powder, shall be strictly prohibited inside or around the outside of special amusement buildings or display areas. Signs shall be conspicuously posted for this purpose.

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Fire Protection Systems

11. **Automatic fire detection.** Special amusement buildings shall be equipped with an automatic fire detection system in accordance with Section 907 of the IFC.
    a) In areas where ambient conditions will cause a smoke detection system to alarm, an approved alternate type of automatic detector shall be installed.
12. **Alarm.** Activation of any single smoke detector, the automatic sprinkler system or any other automatic fire detection device shall immediately sound an alarm at the building at a constantly attended location from which emergency action can be initiated, including the capability of manual initiation of requirements in Section 907.2.11.2.
    a. Cause illumination in the means of egress.
    b. Stop any conflicting or confusing sounds and visuals.
    c. As an alternative to the above, consideration may be given to use of a master lighting switch under the direct control of an attendant at a constantly attended location which would illuminate the area in the event of emergency. This shall be limited to small or temporary facilities.
13. **Automatic Sprinklers:** Special amusement buildings shall be equipped throughout with an automaticsprinkler system in accordance with NFPA 13. Where the special amusement building is temporary, the sprinkler water supply shall be of an approved temporary means.
14. **Emergency Voice/Alarm Communication System:** An emergency voice/alarm communication system, which is also allowed to serve as a public address system, shall be installed in accordance with NFPA 72, and shall be audible throughout the entire special amusement building.
15. **Fire Extinguishers:** An adequate number and type of portable fire extinguishers shall be provided on the premises for use by the staff. At least one 2A:10BC (10-lb. multi-purpose) rated fire extinguisher shall be provided within 75 ft. travel distance to all areas. Extinguishers shall be properly mounted and located near an exit. All staff shall be familiar with the location and use of such fire extinguishers.
16. **Exit Markings:** Exit signs shall be installed throughout amusement buildings. Such markings shall become visible in an emergency. The directional exit marking shall be activated by the automatic fire detection system and the automatic sprinkler system in accordance with system response outlined in paragraph above. Exit signs shall have a battery back-up system. Additional approved directional exit markings shall also be provided when required

by the code or deemed necessary. Where mirrors, mazes or other designs are utilized that disguise the path of egress travel such that they are not apparent, approved low-level exit signs and directional path markings shall be provided and located not more than 8 inches above the walking surface and on or near the path of egress travel.

17. Exits shall be identified by approved self-luminous or electrically illuminated exit signs, permanently or temporarily wired in a satisfactory manner. Exit signs may be externally illuminated by a reliable power source. The size of the letters in the word "Exit" shall be large enough to be seen but not less than 6-inches high and ¾-inches wide. The exit sign shall be of a distinctive color on a contrasting background (eg: red or green letters on a white background or vice-versa) and shall be readily apparent with respect to nearby decorations, interior finish, or other signs.
18. If necessary, low level exit signs located at or near floor level shall be provided. Consideration may also be given to special floor proximity egress path marking such as special internally illuminated wiring, reflective tape or other acceptable product.
19. Emergency lighting is required along all means of egress and in all assembly areas. Battery packs are acceptable as well as emergency generators if the building is to be occupied on a temporary basis. Consideration may be given to the use of flash lights or other portable battery operated hand lights under certain circumstances provided an adequate number of such devices and assigned supervisory personnel are available as directed by the fire official.
20. Each occupied floor shall be provided with at least two (2) approved means of egress, located as remote as possible from each other. Each exit and the access to reach it shall be clearly indicated and marked by directional exit signs as necessary so that every occupant can readily see the direction of escape from any point.
21. Any doorway or passageway that is not an exit or a way to reach an exit, but may be mistaken as an exit, shall be identified with a "No Exit" sign to prevent occupant confusion with designated exits. Every effort shall be made to prevent occupants mistakenly traveling into dead-end spaces in a fire emergency.
22. No decorations, furnishings or equipment shall be allowed to obstruct, impair or otherwise detract attention from the visibility or use of an exit. Under no circumstances shall an exit be part of a mirrored wall.
23. Where mazes, mirrors or other layouts are designed to confound the egress path, approved directional exit marking that will become apparent to the occupant in an emergency shall be provided.

General Requirements

24. Adequate "Fire Lanes" and emergency access to the premises shall be provided.
25. All staff shall be trained and drilled in the duties they are to perform in case of fire, panic or other emergency to effect orderly exiting. This shall include personnel specifically assigned to notify the fire department and other appropriate emergency services. Staff shall be specifically instructed to devote their immediate attention to the safe evacuation of occupants and notification of the fire department before attempting to fight a fire, in order to prevent possible injury or delayed alarm.
26. For added safety, the fire authority may limit the occupant load to a small group of people at a time to be "ushered" through a display with proper supervision. Also, the general public shall be restricted to only those floors or areas which are provided with sufficient exits.

To expedite the plan review and inspection processes, please refer to the information listed below.

Permitting Requirements

27. Provide a written description of the operations for the "Haunted House, Scare House or Haunted Maze".
28. Plan drawings of the installation location and layout, to include; including.
    a. Floor plant layout.
    b. Location of all exits.
    c. Location of all fire extinguishers.
29. Listing of all materials to be used and the fire rated classification of each. NOTE. Only Class A is permitted.

30. Locations of any mirror walls, or other mechanism to confuse occupants.
31. Indicate the locations and use of any smoke or dry-ice machines. NOTE: Smoke machines may not be permitted and may cause alarms in a building with smoke detection installed.
32. Drawings, to include the above requirements, shall be submitted for review and approval, **PRIOR** to installation.
33. ***No "Haunted Houses, Scare Houses or Haunted Mazes" may be constructed, located, or otherwise utilized on the site until a Permit has been issued for the location.***

General Submittal Requirements

34. Each submittal shall have a completed *Kerrville Fire Marshal Plan Review/Permit Application.*
35. Plans approved by the Fire Marshal's Office give authorization for construction. Final approvals are subject to field verification. Any approval issued by the Fire Marshal does not release the contractor or property owner from the responsibility of full compliance with all applicable codes and ordinances relating to the construction project.
36. All installations must concur with the approved plans. Any deviation from the approved plans requires a re-submittal to the Fire Marshal's Office.
37. All fire Marshal inspection forms and permits shall be kept in a permit packet on the job site until final inspection.

Section 8
Propane Exchange

These guidelines are to be followed when a building or facility within the City of Kerrville proposes to install a propane exchange cage within the City of Kerrville City Limits.

Propane exchange operations shall conform to the International Fire Code 2006, as adopted and amended by City of Kerrville and NFPA 58, Standard for the Storage and Handling of Liquefied Petroleum Gases.

This guide does not replace, nor supersede any codes and/or ordinances adopted by the City of Kerrville, or determinations and positions of the Fire Chief or Fire Marshal.

Installation Requirements

1. Installations stored next to buildings are limited to an aggregate capacity of 720 pounds.
2. Cages shall be located at least 20 feet from openings into buildings, fuel dispensing devices, or any portion of a building used as a means of egress.
3. Cages shall be located at least 10 feet from the public way and fire lanes.
4. Cages shall be located a minimum of 3 ft. from any exterior wall.
5. When stored outside of buildings protected with an automatic sprinkler system, the eaves, canopies, or overhangs where the cages are located shall be protected by sprinklers.
6. Cages and cage areas shall be kept free and clear of all combustible materials, including storage, for a distance of at least 10 feet on all sides. This includes merchandise displays.
7. Ground striping will be required on the floor to identify the 10 ft. clear area around the cages.
8. Cages shall be a lockable ventilated metal locker or rack that prevents tampering and pilfering.
9. Cages shall be so located a minimum of 10 ft. from any source of ignition.
10. Cages shall be designed so that containers cannot be stacked on top of each other and designed so that containers are positioned upright with the pressure-relief valve in direct communication with the vapor space of the container.
11. All containers shall be protected by screw-on type caps or collars and container outlet valves shall be closed and plugged when in storage.
12. All containers shall be provided with an OPD valve.
13. Defective containers or containers showing denting, bulging, or excessive corrosion shall be removed from service and properly disposed of.
14. NO SMOKING signs and approved NFPA 704 hazard identification signs shall be posted on the exchange cage. No Smoking signage shall be posted at the exchange cages and within 25 ft. of the surrounding area.
15. Signs listing exchange procedures, company name and 24 hour phone numbers shall be posted on the cage.
16. Signs requiring that customers leave LPG containers outside shall be posted at the building entrance(s).
17. Cages shall be protected from vehicle damage (bollards) in accordance with IFC 2006 Section 312, as follows:
    a. Install 4-inch steel pipes filled with concrete.
    b. Pipes shall be spaced no more than 4 feet apart.
    c. Pipes shall be set not less than 3 feet deep in a concrete footing of not less than 15-inch diameter.
    d. The top of the post shall be a minimum of 3 feet above the ground.
    e. Posts shall not be located less than 3 feet from the cage.
18. The Fire Marshal's Office may approve alternate methods and material as needed.

Operational Requirements

19. All employees with access to the exchange cage shall be trained in the proper handling and operating procedures, including the procedure for handling defective containers.
20. A written inspection checklist for receiving empty containers as well as giving out full cylinders shall be available and used by employees when handling containers.

21. Provisions shall be made for controlling and mitigating unauthorized discharges. A Hazardous Materials Management Plan shall be readily available on site.

To expedite the plan review and inspection processes, please refer to the information listed below.

Permitting and Submittal Requirements

22. Provide a written description of the propane exchange operations.
23. Site plan drawings of the existing site location and conditions, to include;
    a. All buildings and structures.
    b. Fire lanes and fire hydrants.
    c. Location of tanks with regards to building exits.
24. Drawings shall be submitted for review and approval, **PRIOR** to installation.
25. Drawings shall be generated by the installing company specific to the removal operation. Drawings shall show plan view and other pertinent information.
26. The submittal package must include all above requirements and such requirements shall be identified in the submittal package.
27. No propane tanks or cages may be installed or otherwise manipulated on the site until a Propane Exchange Permit has been issued. Any work performed prior to the issuance of this permit may result in a citation being issued for violation of Section 105.6.17 of the 2006 International Fire Code.

General Submittal Requirements

28. Each submittal shall have a completed Kerrville Plan Review/Permit Application.
29. Plans approved by the Fire Marshal's Office give authorization for construction. Final approvals are subject to field verification. Any approval issued by the Fire Marshal's Office does not release the contractor or property owner from the responsibility of full compliance with all applicable codes and ordinances relating to the construction project.
30. All installations must concur with the approved plans. Any deviation from the approved plans requires a re-submittal to the Fire Marshal's Office. Installation, fabrication or otherwise construction of the system is prohibited without approved plans and permit.
31. All fire marshal inspection forms and permits shall be kept in a permit packet on the job site until final inspection.

Section 8
Underground Storage Tank Removal

Underground storage tank removal operations shall conform to the International Fire Code 2006, as adopted and amended by City of Kerrville, NFPA 30, Flammable and Combustible Liquids Code, and API Standard 1604.

Any tank owner, who intends to permanently remove their underground storage tank, must give thirty (30) days prior notice to the Texas Commission on Environmental Quality (TCEQ). This must include the proposed procedures and a schedule for removing the tank(s). Further guidance is contained in Texas Administrative Code 31, Chapter 334 and in API 1604.

This guide does not replace, nor supersede any codes and/or ordinances adopted by the City of Kerrville, or determinations and positions of the Fire Chief or Fire Marshal.

Removal Requirements

1. The area of tank removal shall be barricaded a minimum of 50 ft. from the edge of the tank excavation, as recommended by API.
2. All flammable and/or combustible liquids shall be removed from the tanks and piping, if provided.
3. The On-Site Supervisor shall hold a valid minimum Type B License issued by the Texas Commission on Environmental Quality (TCEQ) for UST Removals.
4. All liquids shall be removed from the tanks prior to removal from the ground and all connecting piping and/or distribution lines shall be removed. Piping will not be permitted to be abandoned in place.
5. All tank openings shall be capped or plugged with the exception of a pressure equalization hole that shall not be less than 0.125 inch (3.2mm) or more than 0.25 inch (6.4mm).
6. Provide two 20-BC portable fire extinguishers within 50 feet of the tank excavation site.
7. "No smoking" signs shall be posted and readily visible.
8. If the tanks are to be triple rinsed/washed, all rinseate liquid shall be disposed of in an approved manner.
9. The tanks shall be purged to remove all flammable vapors prior to removal. The Fire Marshal's Office allows the following vapor removal methods.
    a. Use of a diffused air blower or eductor type air blower.
    b. Vacuum truck operation.
10. The tanks shall be made inert to remove all residual oxygen prior to removal. The Fire Marshal's Office allows the following vapor removal methods.
    a. Prior to tank removal, all tank openings shall be secured and the tanks shall be purged with dry ice at a ratio of 2 lbs. for every 100 gallons of tank capacity, or as recommend by APT 1604.
    b. Carbon Dioxide (CO_2) or Nitrogen (N_2) Method: One cubic foot CO_2 or N_2 per gallon of tank capacity. Triple grounding shall be used with compressed cylinders. The cylinder hose shall fit into a non-conductive plug, and will not be allowed to dangle into the UST.
11. All flammable vapors during the inerting or purging process shall be vented a minimum of 12 ft. from grade.
12. Prior to tank removal from the ground, both Oxygen and LEL measurements shall be taken using a hydrocarbon meter and shall be verified and approved by the field inspector. Tank removal will not be permitted until the Oxygen level is less than 5% and the atmosphere is less than 10% of the LEL.
13. ***Once the tanks have been removed from the ground and secured for transport, the contractor has thirty (30) minutes to begin transporting the tanks from the site to an approved disposal facility.***
14. No hot work (cutting and/or welding) shall be permitted until the tanks are certified safe by the field inspector (additional permits may be required).
15. All tanks shall be marked and labeled, as recommended by APT 1604, accordingly prior to transit.
16. The tanks shall be disposed of in accordance with federal and state regulations. Copies of the destination shipping papers and identification of each tank removed shall be provided to the field inspector at the time of the removal.

17. The contractor shall be responsible for the cleanup of any spills or soil contamination and abatement of the same per state and federal requirements. Copies of all documents for the final soil testing results, and the tank destination shall be provided to the Kerrville Fire Marshal's Office when completed.
18. The Fire Marshal's Office may approve alternate methods and material as needed.

To expedite the permitting and inspection processes, please refer to the information listed below.

Permitting Requirements

19. Provide a written description of the tank removal operations.
20. Site plan drawings of the existing site location and conditions, to include; including.
    a. All buildings and structures.
    b. Fire lanes and fire hydrants.
    c. Location of tanks with regards to the above.
21. Drawings shall be submitted for review and approval, **PRIOR** to removal.
22. Drawings shall be generated by the installing company specific to the removal operation. Drawings shall show plan view and other pertinent information.
23. ***No underground storage tank(s) or associated piping may be removed or otherwise manipulated on the site until a UST Removal Permit has been issued. Any work performed prior to the issuance of this permit may result in a citation being issued for violation of Section 105.6.17 of the International Fire Code 2006.***

General Submittal Requirements

24. Each submittal shall have a completed Kerrville Fire Marshal Plan Review/Permit Application.
25. Plans approved by the Fire Marshal's Office give authorization for construction. Final approvals are subject to field verification. Any approval issued by the Fire Marshal's Office does not release the contractor or property owner from the responsibility of full compliance with all applicable codes and ordinances relating to the construction project.
26. All installations must concur with the approved plans. Any deviation from the approved plans requires a re-submittal to the Fire Marshal's Office. Installation, fabrication or otherwise construction of the system is prohibited without approved plans and permit.
27. All fire marshal inspection forms and permits shall be kept in a permit packet on the job site until final inspection.
28. This office does <u>not</u> review or approve site specific health and safety plans for adequacy, accuracy, or completeness. Compliance with all applicable worker health and safety regulations, including implementation of the site safety plan, is the responsibility of the owner and contractor.

Section 8
Fire Sprinkler Underground
Inspection Requirements

This guide does not replace, nor supersede any codes and/or ordinances adopted by the City of Kerrville, or determinations and positions of the Fire Chief or Fire Marshal.

Minimum Required Inspections

1. Hydrostatic Test
2. Flush
3. Visual
4. Fire Sprinkler Underground Final

Fire Sprinkler Underground Hydrostatic Test

5. All new fire service mains shall be tested hydrostatically at not less than 200 psi pressure for a minimum or two hours, or at 50 psi pressure in excess of the maximum static pressure when the maximum required static pressure exceeds 150 psi.
6. A plus or minus more than 5 psi pressure loss or leaks will result in a failed inspection.
7. All piping must be exposed, with all joints and thrust blocks exposed, and labeling of the pipe must be visible and turned upward.
8. Hydrostatic test shall be made by the installing contractor in the presence of a representative of the Kerrville Fire Marshal's Office.
9. Hydrostatic test of the fire sprinkler underground lines shall be required at the same time the visual inspection is performed. **NO EXCEPTIONS**. The piping will be allowed to be center loaded to prevent pipe movement.
10. Hydrostatic test shall be conducted prior to the cover of the underground pipe. If a hydrostatic test is completed after the piping system is covered and fails, the piping will be required to be uncovered, regardless of cover.

Fire Sprinkler Underground Flush

11. All underground piping shall be thoroughly flushed **PRIOR TO** connecting to the system risers or other aboveground piping system(s). If the underground piping is connected to the system riser, "stacked", both the overhead and underground piping will be required to be flush in accordance with the requirements of NFPA 13 and NFPA 24.
12. The flush of the underground piping shall be completed prior to any overhead fire sprinkler inspections.
13. The minimum flow rate shall not be less than the water demand of the rate of the system, or not less than that necessary to provide a velocity of 10 ft/s, whichever is greater. *See Table 1.*
14. Flush shall be made by the installing contractor in the presence of a representative of the Kerrville Fire Marshal's Office.
15. Proper methods and equipment to perform the flush must be used. All piping used to flush must be properly secured or restrained. Hoses may not be used. Field Fire Inspector must approve of flushing method and equipment.
16. Visual inspection of the installation shall be performed **PRIOR TO** cover. If the piping and joints are covered prior to installation, you will be required to uncover the piping for inspection, regardless of cover. NO EXCEPTIONS.
17. All underground piping and joints must be uncovered and exposed, with labeling of the pipe legible from grade.
18. All thrust blocks will be visually inspected and must be uncovered and exposed to grade.
19. Depth of bury of the pipe shall be measured and verified.
20. All ductile iron, retaining rods, and other non-plastic components shall be externally coated for corrosion and poly-wrapped.

Table 1

Flow Required to Produce a Velocity of 10 ft/s in Pipes

Nominal Pipe Size (in.)	Flow Rate (gpm)
4	**390**
6	**880**
8	**1560**
10	**2440**
12	**3520**

Section 8
Asphalt Kettles and Tar Pits

Underground storage tank removal operations shall conform to the International Fire Code 2006, as adopted and amended by City of Kerrville.

This guide does not replace, nor supersede any codes and/or ordinances adopted by the City of Kerrville, or determinations and positions of the Fire Chief or Fire Marshal.

1. **Transporting.** Asphalt (tar) kettles shall not be transported over any highway, road or street when the heat source for the kettle is operating. Exception: Asphalt (tar) kettles in the process of patching road surfaces.
2. **Location.** Asphalt (tar) kettles shall not be located within 20 feet (6096 mm) of any combustible material, combustible building surface or any building opening and within a controlled area identified by the use of traffic cones, barriers or other approved means. Asphalt (tar) kettles and pots shall not be utilized inside or on the roof of a building or structure. Roofing kettles and operating asphalt (tar) kettles shall not block means of egress, gates, roadways or entrances.
3. **Location of fuel containers.** Fuel containers shall be located at least 10 feet (3048 mm) from the burner. Exception: Containers properly insulated from heat or flame are allowed to be within 2 feet (610 mm) of the burner.
4. **Attendant.** An operating kettle shall be attended by a minimum of one employee knowledgeable of the operations and hazards. The employee shall be within 100 feet (30 480 mm) of the kettle and have the kettle within sight. Ladders or similar obstacles shall not form a part of the route between the attendant and the kettle.
5. **Fire extinguishers.** There shall be a portable fire extinguisher complying with Section 906 and with a minimum 40-B:C rating within 25 feet (7620 mm) of each asphalt (tar) kettle during the period such kettle is being utilized. Additionally, there shall be one portable fire extinguisher with a minimum 3-A:40-B:C rating on the roof being covered.
6. **Lids.** Asphalt (tar) kettles shall be equipped with tight-fitting lids.
7. **Hi-boys.** Hi-boys shall be constructed of noncombustible materials. Hi- boys shall be limited to a capacity of 55 gallons (208 L). Fuel sources or heating elements shall not be allowed as part of a hi-boy.
8. **Roofing kettles.** Roofing kettles shall be constructed of noncombustible materials.
9. **Fuel containers under air pressure.** Fuel containers that operate under air pressure shall not exceed 20 gallons (76 L) in capacity and shall be approved.

Section 9
Appendix Index

- **General Contractor Checklist**
- **Certificate of Occupancy Checklist – Commercial Building**
- **Checklist for Aboveground Storage Tank**
- **Checklist for Underground Storage Tank**
- **Building Systems Information Sheet**
- **High-Piled Storage Occupancy Requirements**
- **Fire Department Connection Sign Design Requirements**
- **Purchasing Knox Company Products**
- **New Construction Process Flow**
- **Fire Sprinkler Underground Process Flow**
- **Fire Sprinkler Aboveground Process Flow**
- **Fire Alarm Process Flow**
- **Access Control Systems Process Flow**
- **Access Control Gate Process Flow**
- **Kitchen Hood Process Flow**

Kerrville Fire Marshal

GENERAL CONTRACTOR CHECKLIST

Fire Protection Systems Readiness Checklist For CO Inspection

Project Information

Project Name: _____

Project Address: _____

Lead Inspector: _____ Contact Information: _____

G.C./Superintendent: _____ Contact Information: _____

This checklist is provided to the GC/Superintendent to help them keep track of the required Fire Marshal Inspections for their project. A similar file is kept in the Fire Marshal's Office. A lead Fire Inspector has been assigned to this project, although other inspectors may visit the site from time to time, the lead Inspector will be responsible for staying in touch to assure timely completion of all required inspections in anticipation of meeting the scheduled opening date.

Sprinkler Underground	**Overhead Sprinklers**	**Fire Alarms**	**Kitchen Hood Systems**
□ Plans Submitted/Approved	□ Plans Submitted/Approved	□ Plans Submitted/Approved	□ Plans Submitted/Approved
□ Visual	□ Visual	□ Visual	□ Visual
□ Hydro	□ Hydro	□ Central Station Monitoring	□ Air Test
□ Flush	□ Flush	□ Initiating Device Test	□ Alarm System Hookup
□ Final	□ Final	□ Final	□ Final

Additional Permits

□ ACS □ AST □ UST □ Fire Pump □ High Piled Storage □ Hazardous Materials

(CO's, Temp CO's and "Permission to Stock") Kerrville has formal procedures for obtaining a CO and/or a Temporary CO. However, when a project is nearly completed the GC may request "permission to stock" on behalf of the tenant. This permission allows the Tenant to use non-construction workers to bring in fixtures, computers, registers, shelving and stock. This permission is normally granted if the fire protection systems, i.e., fire sprinklers and fire alarms, are completely installed, inspected, tested and approved. The Chief Building Official grants this permission after making sure these life safety systems are in place, tested and approved.

As the GC/Superintendent, the construction site remains your responsibility until the CO is granted. We in the Fire Marshal's Office want to do everything we can to help you achieve your goal of opening on time, but we want you to recognize that there are provisions in both the Building and Fire Codes that prohibits the occupying of a structure without these systems in place and operational.

We are providing this checklist along with selected portions of our Fire Marshal Development Guide to help you see how easy it is to be successful the first time through. A complete copy of the Guide can be found on our website (coming soon) or may be obtained through our office. Please call if you have any questions at (830) 257-8449.

CERTIFICATE OF OCCUPANCY CHECKLIST
COMMERCIAL BUILDING

{Some items listed may not apply to your project}

- ☐ **OCCUPANCY/BUILDING USE.** Approved by Planning & Zoning, Engineering, Building, and Fire.
- ☐ **CONTACT KERRVILLE FIRE MARSHAL** – have representative attend the final inspection.
- ☐ **CONSTRUCTION FILE –** Review conditions and letters. Verify compliance in field.
- ☐ **REVIEW APPROVED PLANS -** Verify approval letter, plan requirements and general note conditions.
- ☐ **INSPECTION APPROVAL SIGN-OFFS (at Site) –**
  - ☐ Underground Final
  - ☐ Aboveground Final
  - ☐ Fire Alarm Final
  - ☐ Fire Pump Final
  - ☐ Sprinkler Monitoring Final
  - ☐ Special System (i.e.…High-Pile/High-Rack/High-Racked Stock, Dust Collection, LPG tank, Aboveground Storage Tank)
- ☐ **8 ½ x 11" SITE AND FLOOR PLAN.** Detailed site and floor plan provided for Fire Department planning.
- ☐ **BUILDING ADDRESSING.** Minimum 4 inches in front, contrasting background, plainly visible and legible from the road. Located at highest elevation of building. 4-inch suite numbers on front and back doors.
- ☐ **GATES.** Ingress Emergency access installed and accepted
- ☐ **FIRE LANES.** Fire apparatus access roads stripped as fire lanes in accordance with requirements.
- ☐ **OBSTRUCTION.** Access roads not obstructed i.e.… parking, dumpsters, building materials.
- ☐ **FIRE HYDRANTS.** Fire hydrants are provided per approved plan.
  - ☐ Outlets facing street.
  - ☐ Reflectorized blue marker (s) provided.
  - ☐ 5-foot access to hydrants is clear (i.e.…landscaping, equipment.)
- ☐ **KNOX BOX.** Provided for all buildings.
- ☐ **OCCUPANT LOAD SIGNS.** Provided where load exceeds 50 in assembly uses.
- ☐ **FIRE EXTINGUISHERS.** Light Hazard (offices) – 2A10:BC rating within 75' travel, maximum coverage of 3000sqft, Moderate Hazard (retail, manufacturing, warehouse) 2A10:BC within 75' travel, maximum coverage of 1500sqft. Mounted in a visible and accessible location.
- ☐ **EXIT SIGN ILLUMINATION**. Required when 2 or more exits are required.
- ☐ **EMERGENCY LIGHTING.** Required when 2 or more exits are required.
- ☐ **EXIT DOOR SWING.** Opens in direction of travel when occupant load exceeds 50 or hazardous areas.
- ☐ **EXIT LOCKING HARDWARE.** "No knowledge" single action lever or panic bar on all doors. The main entrance door may have "key locking" hardware on the door when a sign stating, "door shall remain unlocked during business s hours" is posted. Additional deadbolt locks not allowed unless connected to the lever. Panic hardware required in Assembly & Educational where occupant load exceeds 50.
- ☐ **EXIT ROUTE**. Exits may not lead through hazardous rooms. exits must terminate at a public way (i.e.…paved surface.) Not obstructed by parking stalls.
- ☐ **EXIT SPACING**. Exits shall be placed apart at least ½ the diagonal measurement of the room.
- ☐ **DEAD END CORRIDORS**. Not to exceed 20 feet.
- ☐ **ROOF ACCESS.** If provided, proper signage provided.
- ☐ **SMOKE DETECTION SHUT DOWN.** Required for units exceeding 2000 cfm and/or 5 tons.
- ☐ **ELECTRICAL.** Main panel room identified on exterior.
- ☐ **ELEVATORS.** Lunar and override keys provided, Fire Fighter Recall tested, and State inspection posted
- ☐ **FIRE SPRINKLERS.** (Where required)
  - ☐ FINAL INSPECTIONS COMPLETE. Overhead hydrostatic and final acceptance inspections.
  - ☐ FIRE SPRINKLER RISER ACCESS SIGN on exterior and/or interior doors.
  - ☐ RISER SIGNAGE – all valves are identified as to what they control.
  - ☐ HYDRAULIC CALCULATION plate on each riser.
  - ☐ SPARE SPRINKLERS box, sprinklers, and wrench (s) provided.
  - ☐ FDC Caps provided.
- ☐ **FIRE ALARMS.** (Where required)
  - ☐ FINAL INSPECTION complete.
  - ☐ DEVICE MAP POSTED.
- ☐ **FIRE WALLS**. Provided between tenant spaces.

Installation Checklist for Aboveground Storage Tanks
KERRVILLE FIRE MARSHAL
(830) 257-8449

Business Name:_____
Address:_____

INSTALLING CONTRACTOR

Business Name:_____
Address:_____
Phone Number:_____
Job Forman:_____
Installing Contractor License Number:_____

TANKS

1. Capacity _____ Product _____ UL#_____
2. Capacity _____ Product _____ UL#_____

- ☐ TCEQ provided with 30-day notice for tanks over 1,100 gallons.
- ☐ Installation plans and specifications are approved by KFMO.
- ☐ Foam fire protection shall be provided for above-ground tanks over 500 gallons unless UL Listed 2080/2085 tanks. Confirm foam system has approved plans.

THE FOLLOWING SHALL BE INSPECTED PRIOR TO USE:

- ☐ Tanks located as indicated on approved plans from lot lines and buildings.
- ☐ Tanks are marked with UL identification.
- ☐ Tank serial number(s) and U.L. listing number(s) are recorded for each tank.
- ☐ Tank diameter(s) checked and recorded.
- ☐ Tank tightness Air test, *3-5* psi for minimum of 1-hr, witnessed prior to tank(s) being placed in service.
- ☐ The interstitial space (annulus) of double-wall or secondary containment tanks shall be tested either:
  - hydrostatically or with air pressure at a gauge pressure of 3 to 5 psi (20 to 35 kPa) **or**
  - by vacuum at 2.6 psi (18 kPa) **or**
  - in accordance with the tank's listing or the manufacturer's instructions.
  - The pressure or vacuum shall be held for not less than 1 hour or for the duration specified in the listing procedures for the tank.

THE FOLLOWING SHALL BE INSPECTED ON ANY PIPING:

- ☐ All piping and valves are U.L. listed or of approved type.
- ☐ Underground piping shall be installed on at least 6 in. (150 mm) of well-compacted bedding material.
- ☐ In areas subject to vehicle traffic, the pipe trench shall be deep enough to permit a cover of at least 18 in. (450 mm) of well-compacted backfill material and pavement.
- ☐ In paved areas where a minimum 2 in. (50 mm) of asphalt is used, backfill between the pipe and the asphalt shall be permitted to be reduced to 8 in. (200 mm) minimum.
- ☐ In paved areas where a minimum 4 in. (100 mm) of reinforced concrete is used, backfill between the pipe and the asphalt shall be permitted to be reduced to 4 in. (100 mm) minimum.
- ☐ In areas not subject to vehicle traffic, the pipe trench shall be deep enough to permit a cover of at least 6 in. (150 mm) of well-compacted backfill material.
- ☐ Piping within the same trench shall be separated horizontally by at least two pipe diameters. Separation need not exceed 9 in. (230 mm).

- ☐ Two or more levels of piping within the same trench shall be separated vertically by a minimum 6 in. (150 mm) of well-compacted bedding material.
- ☐ Piping is supported and separated to prevent damage and vibration.
- ☐ Tank piping is supported and protected from mechanical damage or fire exposure.
- ☐ Pipe joints are liquid tight, welded, threaded or flanged. Class 1 liquid joints are welded if the joints are located inside the building.
- ☐ Unless tested in accordance with the applicable section of ASME B31.9, all piping shall be tested before being covered, enclosed or placed in use.
  - Testing shall be done hydrostatically to 150 percent of the maximum anticipated pressure of the system **or**
  - pneumatically to 110 percent of the maximum anticipated pressure of the system, **and**
  - the test pressure shall be maintained while a complete visual inspection of all joints and connections is conducted.
  - In no case shall the test pressure be less than a gauge pressure of 5 psi (35 kPa) measured at the highest point of the system
  - the test pressure is maintained for not less than 10 minutes.
  - Care shall be exercised to ensure that these pressures are not applied to vented storage tanks. Such storage tanks shall be tested independently from the piping.
- ☐ The interstitial (annular) space of secondary containment–type piping shall be tested:
  - hydrostatically at a gauge pressure of 5 psi (35 kPa) **or**
  - air pressure at a gauge pressure of 5 psi (35 kPa) **or**
  - shall be tested in accordance with its listing or with the manufacturer's instructions.
  - The pressure source shall be disconnected from the interstitial space to ensure that the test is being conducted on a closed system.
  - The pressure shall be maintained for a minimum of 1 hour.
- ☐ All metal pipes is properly wrapped (with 50% overlap), properly coated, or catholically protected to prevent galvanic action or corrosion.

OPENINGS OTHER THAN VENTS

- ☐ Filling, emptying, and vapor recovery openings are located outside the building, not less than 5 ft. from building openings or lot lines.
- ☐ For top load tanks, a metallic fill pipe is installed to minimize static electricity by terminating within 6 inches of the tank bottom, IFC 2006 Section 3404.2.7.5.5.
- ☐ Tank openings are on the top only.

SPILL/OVERFILL PREVENTION

- ☐ An overfill prevention system is provided for each tank that operates as follows:
  - Automatically shut off the flow of fuel to the tank when the quantity reaches 95 percent of tank capacity **and**
  - Alert the transfer operator when the tank is no more than 90 percent full by restricting the flow of liquid into the tank or triggering the high-level alarm
- ☐ A spill container with a capacity of not less than 5 gallons is provided for each fill connection. Top fill containers are noncombustible, fixed to the tank and equipped with a manual drain valve that drains into the main tank.

VENTS

- ☐ Vent pipes from underground tanks storing Class I liquids are located so that the discharge point is outside of buildings, higher than the fill pipe opening, and not less than 12 ft (3.6 m) above the adjacent ground level.
- ☐ Vent pipe outlets are located and directed so that vapors will not accumulate or travel to an unsafe location, enter building openings, or be trapped under eaves and shall be at least 5 ft (1.5 m) from building openings and at least 15 ft (4.5 m) from powered ventilation air intake devices.

- ☐ Vent pipes from tanks storing Class II or Class IIIA liquids terminate outside of the building and higher than the fill pipe opening.
- ☐ Vent outlets on atmospheric tanks storing Class IIIB liquids are allowed to discharge inside a building if the vent is a normally closed vent.
- ☐ Vent pipes are not be obstructed by devices provided for vapor recovery or other purposes unless the tank and associated piping and equipment are otherwise protected to limit back-pressure development to less than the maximum working pressure of the tank and equipment by the provision of pressure-vacuum vents, rupture discs, or other tank-venting devices installed in the tank vent lines.
- ☐ Vent outlets and devices are protected to minimize the possibility of blockage from weather, dirt, or insect nests.
- ☐ Vent pipes are fitted with return bends, coarse screens, or other devices to minimize ingress of foreign material.
- ☐ Vent pipes and vapor return piping are installed without sags or traps in which liquid can collect.
- ☐ Where tank vent piping is manifolded, pipe sizes are such as to discharge, within the pressure limitations of the system, the vapors they could be required to handle when manifolded tanks are filled simultaneously.
- ☐ Piping systems are bonded and grounded.
- ☐ Each loading and unloading riser is marked to identify the product for which it is to be used.
- ☐ The use of a flame arrester or venting device in a vent line complies with their listing also compliant with API 2028 for a flame arrestor.
- ☐ Tank emergency vent does not vent inside a building.

TANK SUPPORT

- ☐ Tank foundation, support, and anchorages are designed in accordance with NFPA 30:4.2.4 and the IBC, IFC 2006 Section 3404.2.9.2.
- ☐ Tanks containing Class I, II, IIIA liquids that are elevated more than 12 inches above grade shall have a fire-resistance rating of not less than 2-hours in accordance with ASTM E 1529 unless one of the three exceptions to IFC 2006 Section 3404.2.9.1.3 is applicable.

MISCELLANEOUS

- ☐ Location and verbiage for signs prohibiting open flames and no smoking are in accordance with approved plans.
- ☐ Tanks exceeding 100 gallons have NFPA 704 placard.
- ☐ Tank and piping subject to vehicular damage is protected by guard posts designed in accordance with IFC.
- ☐ Drainage control and diking are provided in accordance with approved plans, or the tank is a listed tank with secondary containment.

Installation Checklist for Underground Storage Tanks
KERRVILLE FIRE MARSHAL
(830) 257-8449

Business Name:_____
Address:_____

INSTALLING CONTRACTOR

Business Name:_____
Address:_____
Phone Number:_____
Job Forman:_____
Installing Contractor License Number:_____

TANKS

3. Capacity _____ Product _____ UL#_____
4. Capacity _____ Product _____ UL#_____
5. Capacity _____ Product _____ UL#_____
6. Capacity _____ Product _____ UL#_____
7. Capacity _____ Product _____ UL#_____
8. Capacity _____ Product _____ UL#_____

- ☐ TCEQ provided with 30-day notice.
- ☐ Installation plans and specifications are approved by KFMO.

THE FOLLOWING SHALL BE INSPECTED PRIOR TO PLACEMENT IN PIT:

- ☐ Tanks are marked with UL identification.
- ☐ Tank serial number(s) and U.L. listing number(s) are recorded for each tank.
- ☐ Tank diameter(s) checked and recorded.
- ☐ Tank tightness Air test, *3-5* psi for minimum of 1-hr, witnessed prior to tank(s) being placed in pit.
- ☐ The interstitial space (annulus) of double-wall or secondary containment tanks shall be tested either:
  - hydrostatically or with air pressure at a gauge pressure of 3 to 5 psi (20 to 35 kPa) **or**
  - by vacuum at 2.6 psi (18 kPa) **or**
  - in accordance with the tank's listing or the manufacturer's instructions.
  - The pressure or vacuum shall be held for not less than 1 hour or for the duration specified in the listing procedures for the tank.
- ☐ Clean backfill available. pit is free of rocks, clumps, trash and debris. Pea-gravel must be used with fiberglass tanks.

THE FOLLOWING SHALL BE INSPECTED AFTER PLACEMENT IN PIT:

- ☐ Tanks located a minimum of 3-feet from lot lines and buildings.
- ☐ A minimum distance of 1 foot, shell to shell, shall be maintained between tanks.
- ☐ Tanks shall be properly anchored. **Exception: acceptable hydrology study**
- ☐ Sampling tubes of a minimum 6 inches in diameter are installed in the backfill material of each underground flammable or combustible liquid storage tank.
- ☐ The tubes extend from a point 12 inches below the average grade of the excavation to ground level
- ☐ Tubes are in sumps provided with suitable surface access caps.
- ☐ Each tank site is provided with a sampling tube sump at the corners of the excavation with a minimum of four sumps.
- ☐ Sampling tubes are placed in the product line excavation within 10 feet of the tank excavation and one every 50 feet routed along the product lines towards the dispensers, a minimum of two are provided.

- ☐ Tank(s) not subjected to vehicular traffic shall have a minimum cover of:
  - 12-inches of backfill and 12-inches of clean earth **or**
  - 12-inches of backfill plus 4-inches reinforced concrete
- ☐ Tanks subject to vehicular traffic shall have a minimum cover of:
  - 36-inches of backfill **or**
  - 18-inches of compacted backfill plus 6 inches reinforced concrete that extends at least 1-foot beyond outline of the tanks, **or**
  - 18-inches of compacted backfill plus 8-inches asphaltic concrete that extends at least 1-foot beyond outline of the tanks.
- ☐ Backfill placed (all openings and fittings remain exposed). Fill material should be properly tamped against belly of the tank to fill all voids.

THE FOLLOWING SHALL BE INSPECTED BEFORE COVERING ANY PIPING:

- ☐ All piping and valves are U.L. listed or of approved type.
- ☐ Underground piping shall be installed on at least 6 in. (150 mm) of well-compacted bedding material.
- ☐ In areas subject to vehicle traffic, the pipe trench shall be deep enough to permit a cover of at least 18 in. (450 mm) of well-compacted backfill material and pavement.
- ☐ In paved areas where a minimum 2 in. (50 mm) of asphalt is used, backfill between the pipe and the asphalt shall be permitted to be reduced to 8 in. (200 mm) minimum.
- ☐ In paved areas where a minimum 4 in. (100 mm) of reinforced concrete is used, backfill between the pipe and the asphalt shall be permitted to be reduced to 4 in. (100 mm) minimum.
- ☐ In areas not subject to vehicle traffic, the pipe trench shall be deep enough to permit a cover of at least 6 in. (150 mm) of well-compacted backfill material.
- ☐ Piping within the same trench shall be separated horizontally by at least two pipe diameters. Separation need not exceed 9 in. (230 mm).
- ☐ Two or more levels of piping within the same trench shall be separated vertically by a minimum 6 in. (150 mm) of well-compacted bedding material.
- ☐ Piping is supported and separated to prevent damage and vibration.
- ☐ Unless tested in accordance with the applicable section of ASME B31.9, all piping shall be tested before being covered, enclosed or placed in use.
  - Testing shall be done hydrostatically to 150 percent of the maximum anticipated pressure of the system **or**
  - pneumatically to 110 percent of the maximum anticipated pressure of the system, **and**
  - the test pressure shall be maintained while a complete visual inspection of all joints and connections is conducted.
  - In no case shall the test pressure be less than a gauge pressure of 5 psi (35 kPa) measured at the highest point of the system
  - the test pressure is maintained for not less than 10 minutes.
  - Care shall be exercised to ensure that these pressures are not applied to vented storage tanks. Such storage tanks shall be tested independently from the piping.
- ☐ The interstitial (annular) space of secondary containment–type piping shall be tested:
  - hydrostatically at a gauge pressure of 5 psi (35 kPa) **or**
  - air pressure at a gauge pressure of 5 psi (35 kPa) **or**
  - shall be tested in accordance with its listing or with the manufacturer's instructions.
  - The pressure source shall be disconnected from the interstitial space to ensure that the test is being conducted on a closed system.
  - The pressure shall be maintained for a minimum of 1 hour.
- ☐ All metal pipes is properly wrapped (with 50% overlap), properly coated, or catholically protected to prevent galvanic action or corrosion.

SPILL/OVERFILL PREVENTION

- ☐ A spill container with a capacity of not less than 5 gallons is provided for each fill connection. Top fill containers are noncombustible, fixed to the tank and equipped with a manual drain valve that drains into the main tank.
- ☐ An overfill prevention system is provided for each tank that operates as follows:
  - Automatically shut off the flow of fuel to the tank when the quantity reaches 95 percent of tank capacity **and**
  - Alert the transfer operator when the tank is no more than 90 percent full by restricting the flow of liquid into the tank or triggering the high-level alarm

VENTS

- ☐ Vent pipes from underground tanks storing Class I liquids are located so that the discharge point is outside of buildings, higher than the fill pipe opening, and not less than 12 ft (3.6 m) above the adjacent ground level.
- ☐ Vent pipe outlets are located and directed so that vapors will not accumulate or travel to an unsafe location, enter building openings, or be trapped under eaves and shall be at least 5 ft (1.5 m) from building openings and at least 15 ft (4.5 m) from powered ventilation air intake devices.
- ☐ Vent pipes from tanks storing Class II or Class IIIA liquids terminate outside of the building and higher than the fill pipe opening.
- ☐ Vent pipes are not be obstructed by devices provided for vapor recovery or other purposes unless the tank and associated piping and equipment are otherwise protected to limit back-pressure development to less than the maximum working pressure of the tank and equipment by the provision of pressure-vacuum vents, rupture discs, or other tank-venting devices installed in the tank vent lines.
- ☐ Vent outlets and devices are protected to minimize the possibility of blockage from weather, dirt, or insect nests.
- ☐ Vent pipes are fitted with return bends, coarse screens, or other devices to minimize ingress of foreign material.
- ☐ Vent pipes and vapor return piping are installed without sags or traps in which liquid can collect.
- ☐ Where tank vent piping is manifolded, pipe sizes are such as to discharge, within the pressure limitations of the system, the vapors they could be required to handle when manifolded tanks are filled simultaneously.
- ☐ Piping systems are bonded and grounded.
- ☐ Each loading and unloading riser is marked to identify the product for which it is to be used.

Kerrville Fire Marshal

BUILDING SYSTEMS INFORMATION SHEET

Fire Protection Systems Information
For
Building Owner/Manager/Tenant Information Sheet

The building you own, operate, manage or lease is equipped with a number of fire protection related systems and features that require your regular attention. In fact, the Fire Code that the City of Kerrville has adopted requires you to maintain these systems and features on at least an annual basis and in some cases semi-annually.

This same adoption requires the Fire Marshal to come by and inspect your facility on a regular basis as well. Our goal is to inspect each commercial facility on an annual basis. So far, we have been able to keep up with our burgeoning growth.

But we have identified a problem that this notification should solve. That problem is that owners, operators and tenants of buildings don't seem to be aware of the requirement to provide regular maintenance and testing of their fire protection systems. Likewise, they don't seem to appreciate the importance of keeping up to date emergency contact information supplied to the company who is monitoring their fire alarm system.

So, this letter is intended to officially notify you as the owner, property manager or tenant of a protected building that you have the responsibility to have your fire protection systems inspected and tested at least once each year and that the Fire Marshal's Office wants the opportunity to witness this inspection and test by requiring you to notify us of that inspection and test at least 72 hours before it's start.

You are also required to keep updated emergency contact information with your alarm system monitoring company and you must call us to replace keys in the Knox Box that no longer are in use. Failure to provide these required services and information exposes you to the potential of being brought before the Municipal Court and punished as they direct.

Please contact our Fire Marshal's Office at (830) 257-8449, if you have any questions about these requirements.

Fire System Monitoring Company Name: _____

Fire System Monitoring Company Contact Number: _____

This Address's Account Number & Password: _____

Fire Sprinkler Systems Service Company Name: _____

Contact Person and Number: _____

Fire Alarm System Service Company Name: _____

Contact Person and Number: _____

Kitchen Hood System Service Company Name: _____

Contact Name and Number _____

Kerrville Fire Marshal

HIGH-PILED STORAGE OCCUPANCY REQUIREMENTS

For

[ENTER OCCUPANCY NAME/ADDRESS]

This DOCUMENT is intended to provide members of management with the general operational requirements for High-Piled Storage, as defined by the International Fire Code 2006, Section 2302.

All racks and storage areas shall not be modified without prior approval from the Fire Marshal. Any deviation from the originally approved storage plan will required a new permit is issued.

High-Piled Storage Requirements

1. A store floor plan, layout, or facility plan, shall be permanently mounted or affixed at the main entrance to the facility and at the automatic fire sprinkler riser room.
2. All applicable requirements of IFC 2006 Chapter 23 shall be met.
3. Aisles shall be kept clear of storage, waste material, displays and debris at all times. Storage in the aisles, during normal operations or restocking, can allow a fire to jump to the adjacent storage rack and further expand the fire.
4. During restocking operations, a minimum unobstructed width of 48-in. (4 ft.) shall be maintained for all aisles. Stocking materials and pallets shall be stored only on one side of the aisle and shall not be zigzagged throughout the aisle as this creates an obstruction. Storage during restocking shall be as brief as possible.
5. All emergency exits are marked with yellow floor stripping. At no time shall any emergency exit door or fire department access door be blocked, locked or obstructed. No storage is permitted in any exit accessway.
6. Maximum storage height signage and stripping shall be maintained and visible at all times. Striping shall be a minimum of a 6 in contrasting strip around the perimeter of the storage area and on the rack structure itself.
7. No storage of any king is permitted in the entry vestibules. Storage or displays are only permitted in vestibule side corridors or exterior facade of the building.
8. Flue Spaces: No storage or obstructions are permitted in the flue spaces. The flue spaces are the 6-in spaces between the racks. It is recommended that a method to prevent obstructions in the flue space is provided. However, prior approval from the Fire Marshal is required. These spaces allow heat to operate the sprinkler heads and water to penetrate to the seat of the fire.
9. The fixture plan and location of all products in the store shall not be changed or altered without a permit and approval from the Fire Marshal. The fire protection criteria for the facility is based upon certain hazards are maintained in specific areas. (i.e paints and other flammable and combustible liquids)

This store is equipped with the **[ENTER SPRINKLER TYPE(S)]** sprinklers for the storage areas. Based upon the requirements of this sprinkler, the following storage height restrictions shall be enforced.

Maximum Storage Height

10. The maximum storage height for the building is set at **[ENTER MAXIMUM STORAGE HEIGHT]** ft. in areas of High-Piled Storage, as identified on Sheet **[ENTER SHEET NUMNER]**. The remainder of the store is 12 ft. The top of the strip in all HPS areas shall be **[ENTER MAXIMUM STORAGE HEIGHT]** ft, and 12 ft. in the remainder of the store. In addition, stripping has been provided a various locations at the perimeter walls and on all columns throughout the store. **NO STORAGE IS PERMITTED ABOVE [XX] FEET FOR ANY REASON.**
11. No storage is permitted within 3 ft. of any sprinkler head.

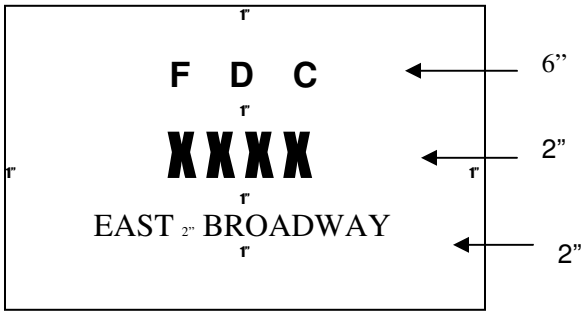
Fire Alarm/Sprinkler System/Standpipe

12. If for any reason the fire alarm system activates, please do not attempt to reset or silence the alarm. The monitoring company will contact 911 and the Fire Department will be dispatched to investigate.
13. **If an alarm is active, store personnel need to direct all customers to the nearest emergency exits. NO EXCEPTIONS.**
14. If it is necessary to turn-off, or otherwise impair the fire alarm or fire sprinkler system, please contact the Fire Marshal's Office immediately.
15. The standpipe hose connections shall be unobstructed and clearly visible at all times.

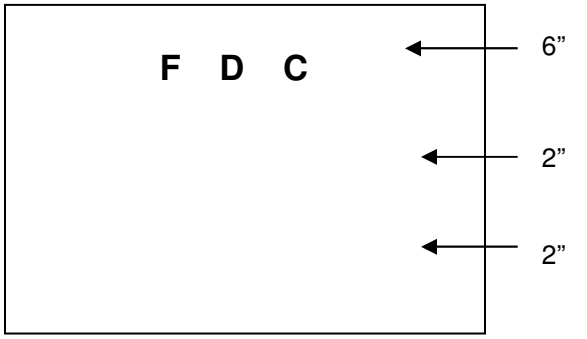
KERRVILLE FIRE MARSHAL'S OFFICE

FIRE DEPARTMENT CONNECTION (FDC) SIGN DESIGN REQUIREMENTS

1. Sign shall be constructed from a 15" high by 18" wide metal substrate no thinner then .063.
2. Sign shall have rounded corners.
3. Background color of sign shall be "Fire Engine Red" non-reflective.
4. White reflective letters shall be used as set out below.
5. Letter shall be a font comparable to "Folio medium" or "Helvetica medium".
6. Sign shall be permanently attached to a wall directly above fire department connection or below freestanding FDC.
   - If sign is to be attached to the building it shall be 72" from the ground to the bottom of sign, unless otherwise approved by Fire Marshal.
   - If the sign is to be mounted to a remote FDC it shall be mounted on a galvanized steel pipe *(chain link fence post)*. The post shall be mounted behind the FDC within 1 to 1 ½ feet from the FDC or an area approved by the Fire Marshal. The post shall be set in concrete below ground. The sign shall be mounted to the post 4 to 6 inches above the FDC. The sign shall be mounted to the post using stainless one-way screws or stainless bolts using a stainless locking nut. The post shall be cut to 4 inches above the sign and a cap placed on top of the post.
7. First line (FDC) shall be 6" high letters with 3" between letters.
8. Second and third lines shall be 2" high letter with ½" spacing between letters.
9. There shall be a 1" margin completely around sign and 1" spacing between lines of text.
10. There shall be 2" spacing between and complete words.
11. Second and third line shall have address of building or suite number that system provides for.



EXAMPLE



YOURS

Purchasing Equipment from Knox Company

Instructions

Go to web address **www.knoxbox.com**

Click on online purchase.

Click on the product.

Type in the zip code “78028” and click continue.

A list of fire departments will come up, click on Kerrville Fire Department then click continue.

Select buy now for the product.

This will bring up the product.

Select the correct product according to the list below.

Fill out the information and purchase the product.

Product List

Knox Box Type: 3200 series Hinged, Surface or Recessed

Recessed Mounting Kit for 3200 Hinged Door 3290

Key Switches: Model 3502

Padlock: Model 3753 – Exterior

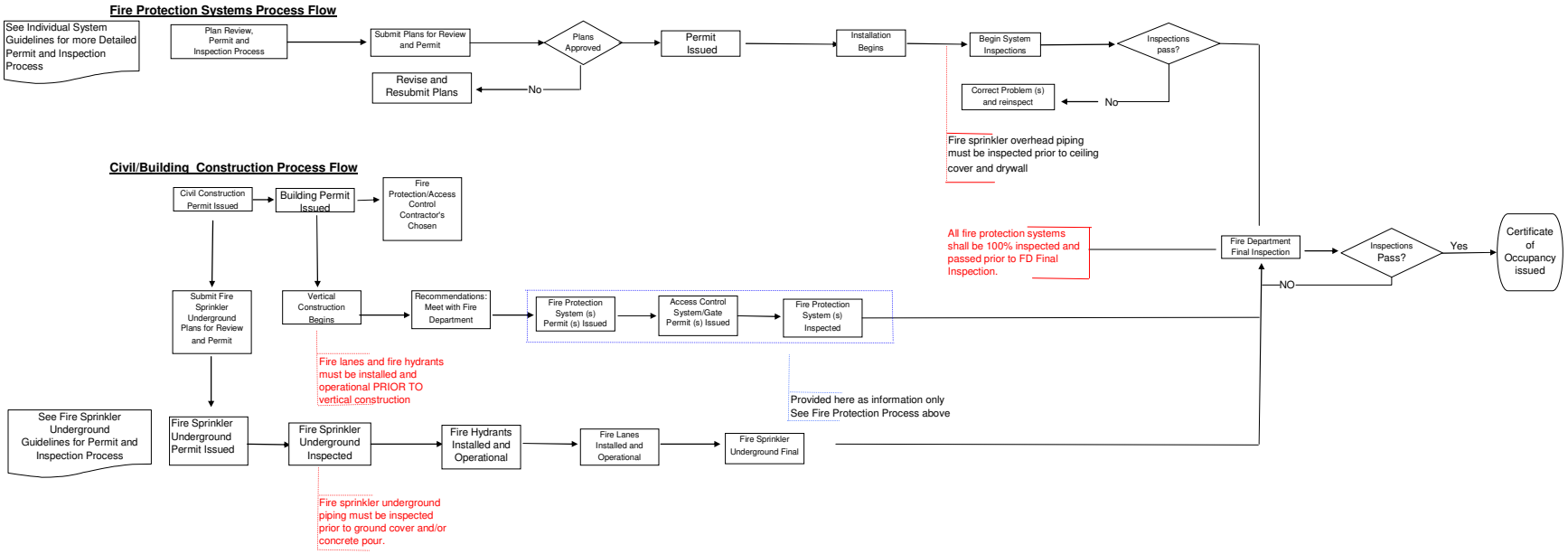
FDC Plugs: Model 3011 – 2.5 inch Bright Stainless Cover (Order 2)
Model 5002 - 5 inch Hard-Anodized Aluminum (Stortz)
Model 3050 - 1.5 inch

Knox StorzGuard Kits - 30° Elbow (Part Number 5042 for Elbow Kit)

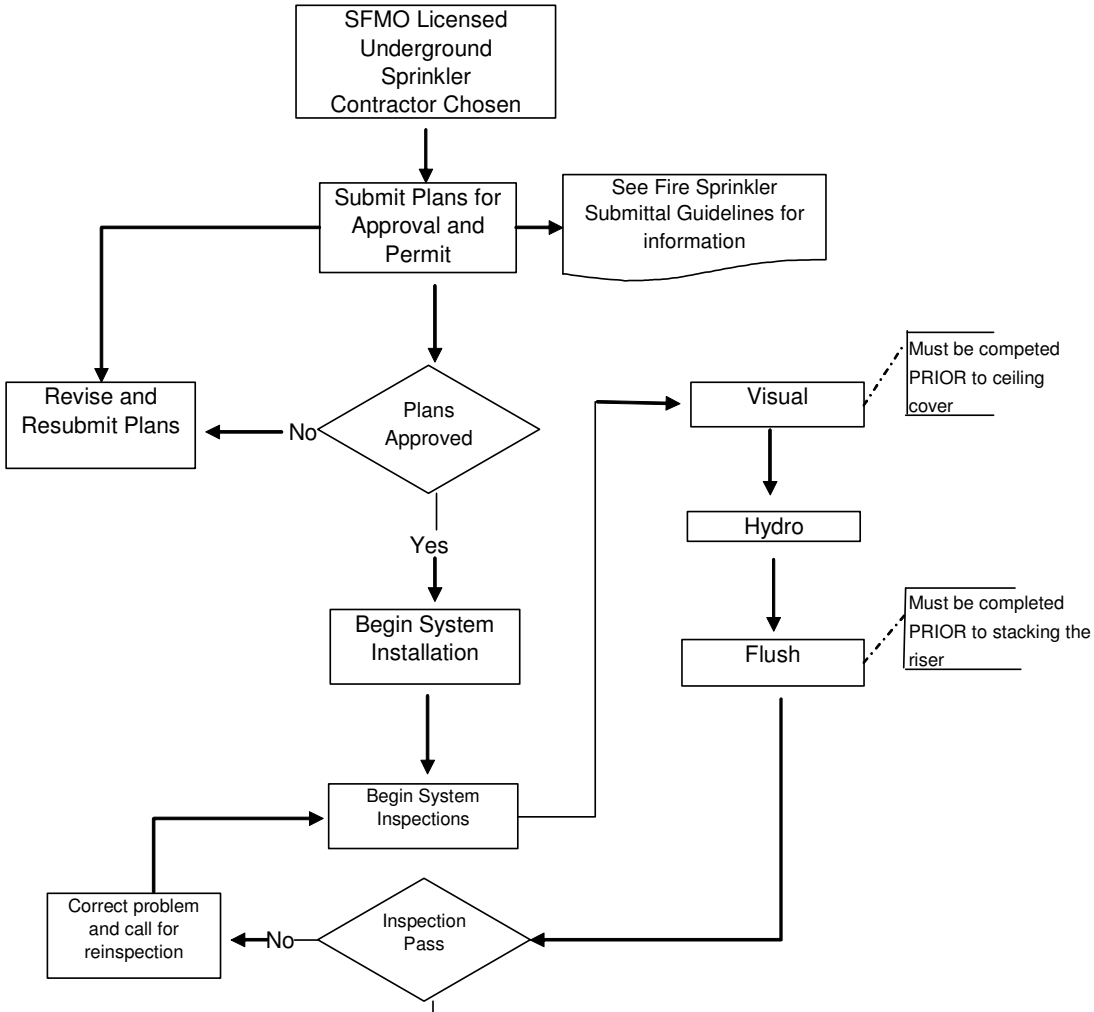
Knox StorzGuard Kits – STRAIGHT (Part Number 5040 Adapter Kit Type)

SecureCap - Locking Hydrant Cap – Model 4011

New Construction Process Flow



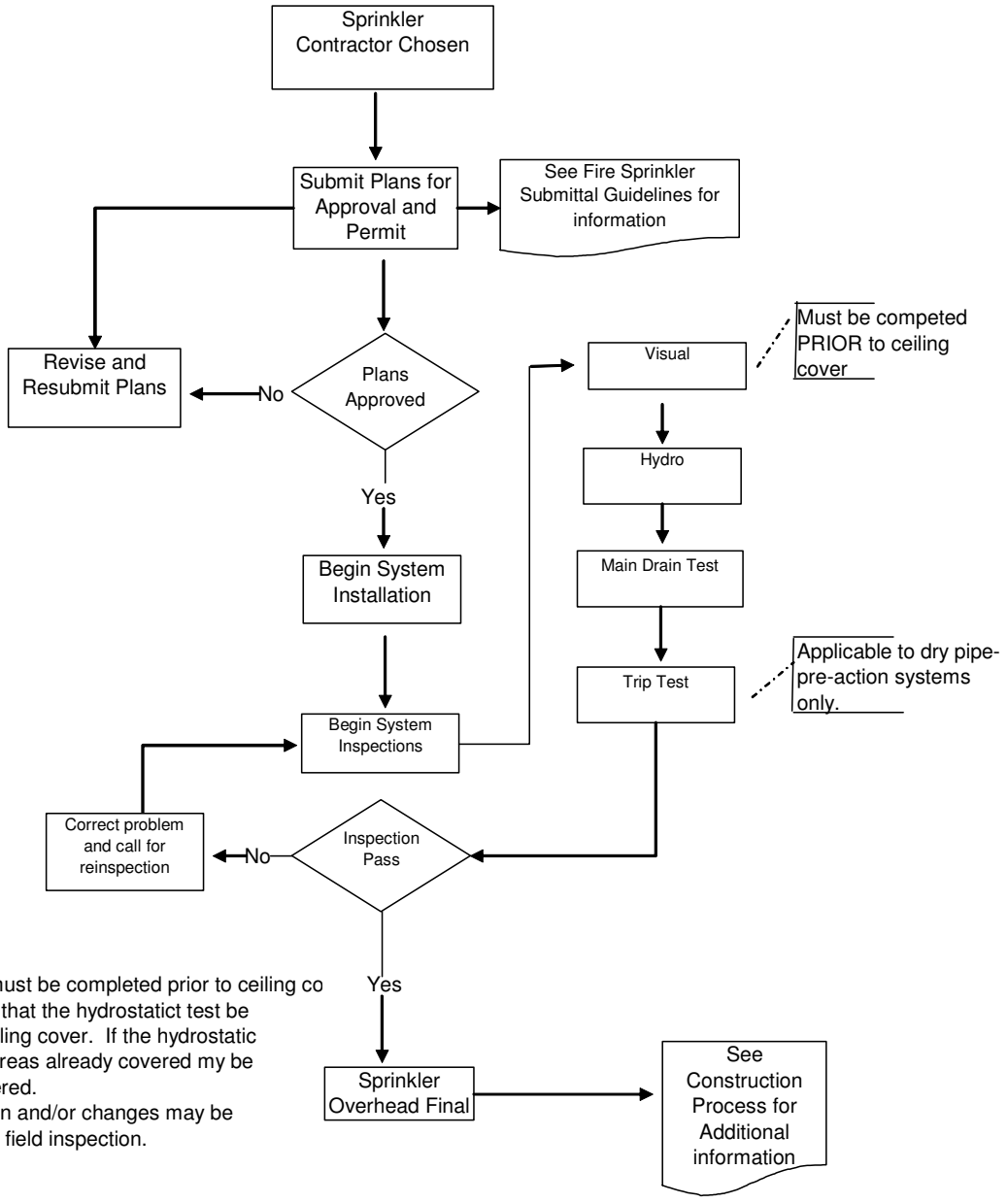
Fire Sprinkler Underground Process Flow



Oh, By The Ways…

1. Visual Inspection must be completed prior to covering the pipe.
2. It is recommended that the hydrostatic test completed prior to cover. If the test fails areas already covered may be required to be uncovered.
3. Connection of the underground spigot to overhead riser prior to flushing, or "stacking the riser" may result in the overhead pipe being required to be flushed.

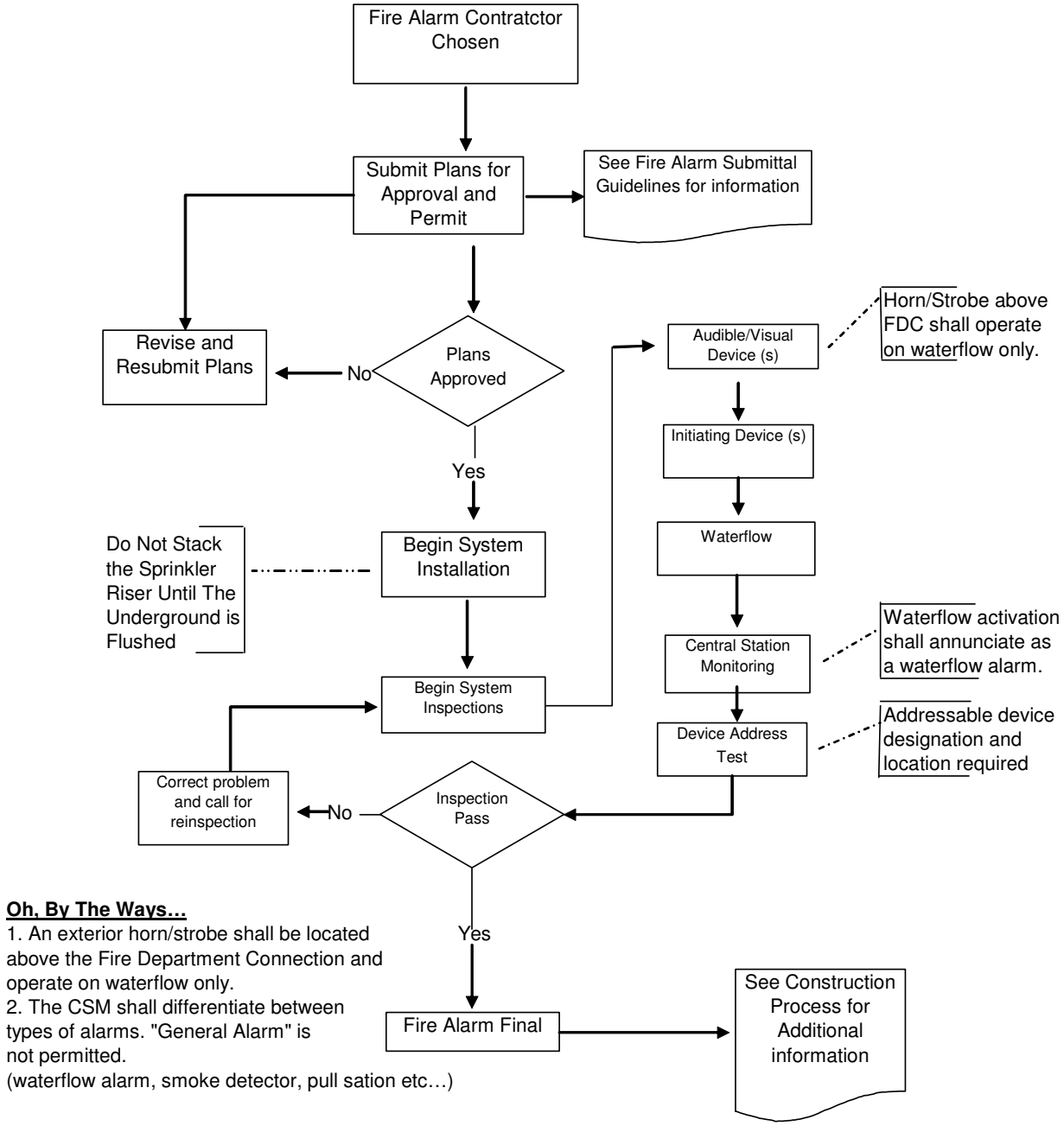
Fire Sprinkler Aboveground Process Flow



Oh, By The Ways…

1. Visual Inspection must be completed prior to ceiling co
2. It is recommended that the hydrostatict test be completed prior to ceiling cover. If the hydrostatic test fails, the ceiling areas already covered my be required to be uncovered.
3. Additional protection and/or changes may be Required based upon field inspection.

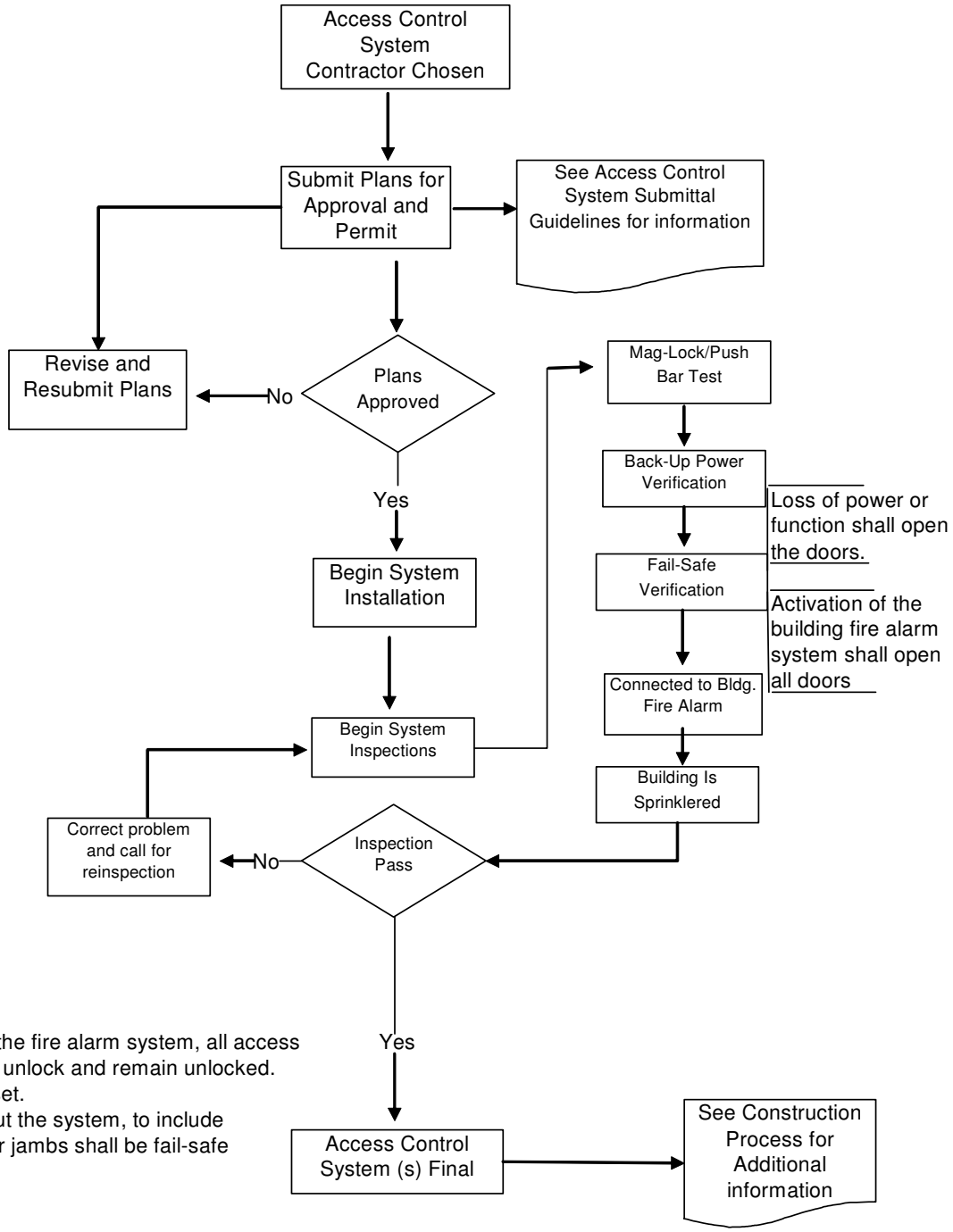
Fire Alarm Process Flow



Oh, By The Ways…

1. An exterior horn/strobe shall be located above the Fire Department Connection and operate on waterflow only.
2. The CSM shall differentiate between types of alarms. "General Alarm" is not permitted.
(waterflow alarm, smoke detector, pull sation etc…)

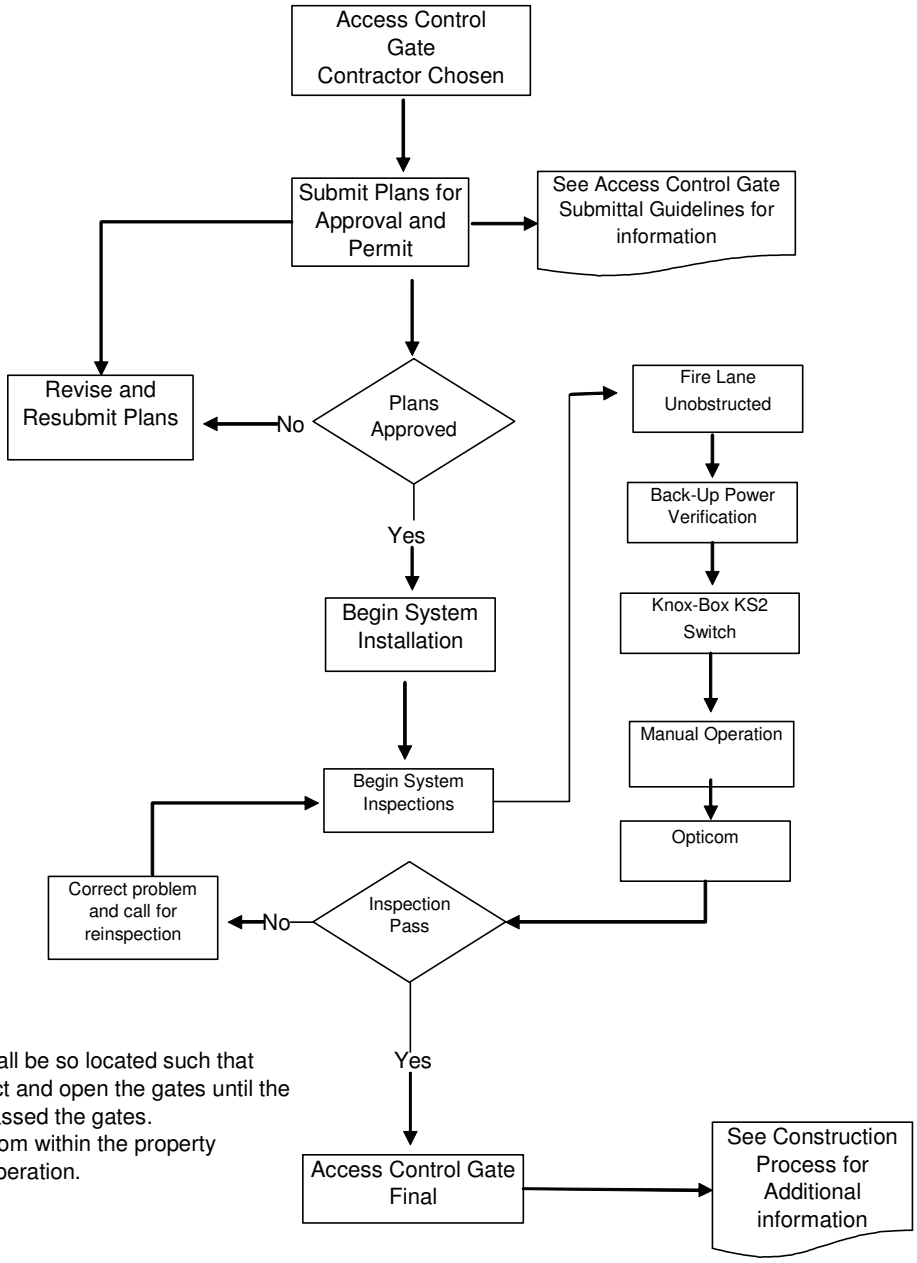
Access Control System Process Flow



Oh, By The Ways…

1. Upon activation of the fire alarm system, all access controlled doors shall unlock and remain unlocked. until the fire alarm reset.
2. All wiring throughout the system, to include the pigtails at the door jambs shall be fail-safe

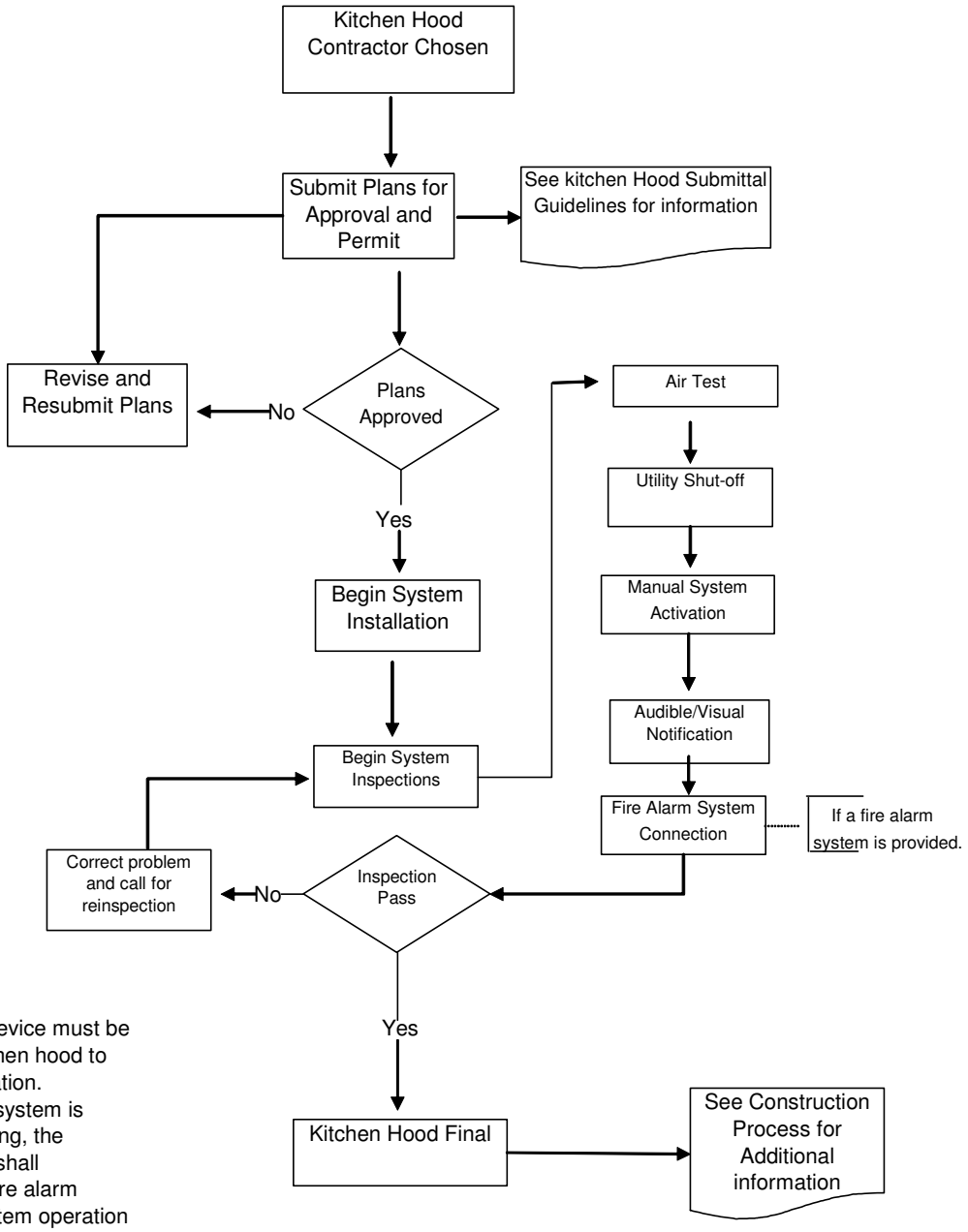
Access Control Gate Process Flow



Oh, By The Ways…

1. Opticom sensor shall be so located such that the received will detect and open the gates until the apparatus is safely passed the gates.
2. Gates shall open from within the property without any manual operation.

Kitchen Hood Process Flow



Oh, By The Ways…

1. An audible/visual device must be provided with the kitchen hood to indicate system operation.
2. When a fire alarm system is provided for the building, the kitchen hood system shall be connected to the fire alarm and shall indicate system operation and activate the builiding fire alarm.
3. Provide a K Type fire extinguisher in the kitchen.

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